AN ANALYSIS OF THE USE AND DESIGN OF RESIDENTIAL GARDENS IN ADELAIDE, SOUTH AUSTRALIA

by

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Errata

AN ANALYSIS OF THE USE AND DESIGN OF RESIDENTIAL GARDENS IN ADELAIDE, SOUTH AUSTRALIA.

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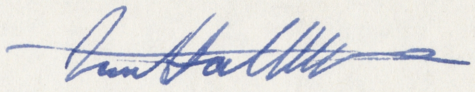
Page	Line	Correction
6	32	"persumably" should read "presumably"
19	5	"sutdy" should read "study"
24	last	"4.6 metres (15 feet)" should read "1.2 metres (4 feet)"
51	24	"measurements" should read "measurement"
64	6	"test" should read "tested"
66	18	"self-explanitory" should read "self-explanatory"
66	20	"barbequing" should read "barbecuing"
72	11	"ubiquitious" should read "ubiquitous"
74	10	"adult's" should read "adults'"
79	8	"Table 5.07" should read "Table 5.01"
97	1	"espeically" should read "especially"
114	Table 6.01	"barbequing" should read "barbecuing"
115	1	"barbequing" should read "barbecuing"
115	10	"barbequing" should read "barbecuing"
126	10	"per sent" should read "per cent"
136	Table 7.09	"barbequing" should read "barbecuing"
146	5	"devleopment" should read "development"
151	17	"composits" should read "composites"
153	Table 7.20	"barbequing" should read "barbecuing"
161	Table 7.29	"barbequing" should read "barbecuing"
168	Table 7.36	"barbequing" should read "barbecuing"
179	19	"Adealide" should read "Adelaide"
193	2	"aboslute" should read "absolute"
197	7	"alternate" should read "alternative"
198	20	"alternate" should read "alternative"
199	22	"alternate" should read "alternative"
200	1	"heirarchy" should read "hierarchy"
200	6	"heirarchy" should read "hierarchy"
205	Question 18:D	"barbequing" should read "barbecuing"
208	Question 34:3	"barbequing" should read "barbecuing"
222	Section 27-29 line 1	"barbequing" should read "barbecuing"

Except where otherwise acknowledged in the text, this thesis represents the original research of the author.



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ABSTRACT

This study is a contribution to a continuing debate over the value of the private garden space associated with low density suburban housing. Proponents of medium-density housing, a form of housing which offers its occupants significantly less private garden space than low density suburban housing, argue that a reduction in garden sizes would result in savings of land and in development and servicing costs, at the same time facilitating the development of public or semi-private open spaces. Defenders of suburban housing argue that the garden is an important adjunct to the home. The debate cannot be resolved without empirical data on the use and design of gardens such as those presented in this study.

A combination of large scale aerial photographs and an interview questionnaire were used to collect data on the design and use of a sample of gardens in Adelaide, South Australia, examining at the household level the design of gardens, the design preferences of their occupants, the use of gardens for gardening activities, household ancillary purposes, and recreation, and the structure and characteristics of the households. One thousand and fifty-eight gardens were photographed and members of the households occupying 430 of the photographed gardens were interviewed.

One or more members of 95 per cent of the sampled households were involved in the design and maintenance of gardens and 90 per cent of the gardeners derived some enjoyment from gardening activities. Ninety-nine per cent of the households used their gardens for at least one form of household ancillary activity -- drying laundry -- and most used their gardens for several other household ancillary activities. Gardens were used for at least one type of recreation activity by 85 per cent of the households and the back garden was used for recreation by more of the

sampled households than was any other outdoor recreation facility. The data do not sustain the assumption, inherent in medium-density proposals, that residential gardens are unused and unnecessary and there are no suitable alternate venues for many of the activities carried out in gardens. It is concluded, therefore, that widespread development of medium-density housing would result in a reduction of individual contributions to the residential landscape and increased demand for public and commercial recreation facilities.

The study is presented in three parts. The three introductory chapters in Part I describe the controversy over the importance of suburban gardens, the traditional and "new" medium-density forms of housing, and the methods employed in the collection and analysis of the data. Part II begins with the results of a cluster analysis of the data which serve as an introduction to the data. In the remaining three chapters of Part II data on garden design and gardening, the use of gardens for recreation, and factors influencing garden use and design are presented as a set of observations about the sampled households and gardens. Discussions of the implications of these data are left for Part III in which the aesthetic and economic criticisms of suburban housing are re-examined and some implications of reducing the size of residential gardens are considered.

PREFACE

Radical assumptions are sometimes made by planners and others seeking solutions to pressing urban problems. This thesis questions one such assumption, the assumption that the gardens[1] associated with traditional detached suburban housing are little used and wasteful of land.

The study developed out of an earlier study of residential development and open space preservation programmes on the Saanich Peninsula, an attractive rural area north of Victoria, British Columbia (Halkett 1971, 1973). One of the conclusions drawn from the Saanich Peninsula study is that open space could be preserved by building clusters of medium-density housing surrounded by public open space or farmland. The underlying principle is that the private garden space available to individual households can be reduced to half or less than half of the amount provided in conventional subdivision while the land "saved" remains as open space. This solution to the problem of open space preservation is virtually conventional wisdom in the literature on open space preservation[2] where it is argued that medium-density cluster developments or "open space communities", besides achieving the aesthetic aims of preserving open space, offer economic advantages by reducing the area requiring servicing in new residential development. Medium-density housing is not seen as a solution to the problems of new residential development on the urban fringe alone. Courtyard houses, townhouses, and other forms of medium-density development are becoming increasingly

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1. The word "garden" is used throughout the study to describe the open portions of residential blocks, those parts of blocks not occupied by dwellings. Relative to the location of dwellings within blocks discrete portions of blocks are referred to as "front gardens" and "back gardens".

2. See, for example, Moe, *et al.* (1968:45) and Little (1969:49).

common on the limited areas of land available for new residential development in inner city and established suburban areas. In these areas, of course, the objective is to build as many dwellings as possible in the space available; nevertheless medium-density developments in established residential areas often provide public or semi-private open spaces to compensate residents for the limited garden space associated with the individual dwellings.

The medium-density solution to housing problems is predicated on the fundamental assumption that the garden space available to households in conventional suburban development is more than the average household requires and that the needs of households can be satisfied by substantially less private open space. This assumption is not always articulated by the proponents of medium-density development -- it was not articulated in the Saanich Peninsula study, for example -- and it has been the subject of very little systematic study. There is an element of presumption, therefore, in medium-density proposals, such as those made in the Saanich Peninsula study, when they are made without any empirical understanding of how households use their gardens or how the private elements of the residential landscape function. This study is directed towards overcoming that lack of understanding through a description of the elements of the residential environment that medium-density development would change. Until the *status quo* is understood there is little possibility of fairly evaluating deviations from the *status quo*.

It is a pleasure to acknowledge the advice and help of the great many people who took an interest in this project. In the Department of Geography, School of General Studies, The Australian National University, I particularly wish to thank Professor B. L. C. Johnson, Head of the Department and one of my supervisors, who smoothed paths for me and gave

me valued advice on the planning of the study and on the presentation of the thesis; Dr. John Chappell, the second of my supervisors, who helped me with many methodological problems and read and commented on several drafts of the thesis; Dr. Larry Sternstein and Mr. Ken Johnson who were always willing to talk about the work and each of whom spent many hours reading and commenting on the thesis in various stages of its development; and Ms. Pam Millwood whose help with the photographic and cartographic work was invaluable. I am grateful to the many people in Adelaide who took time to answer my questions. I am particularly grateful to Mr. Hugh Stretton, Department of History, University of Adelaide, who encouraged me from the start, introduced me to many helpful people, and read and commented on an early draft of the thesis; Professor G. H. Lawton and Professor M. McCaskill, Heads of the Departments of Geography at, respectively, the University of Adelaide and the Flinders University of South Australia, who made me welcome in Adelaide and provided me with facilities in their departments while I was carrying out my field work; and Mr. Rob Cheesman who provided me with the photographs reproduced in Chapter 2. Finally, I wish to thank my wife Sandy for her constant help and encouragement and for enduring the little frustrations of life in a flat while she watched me write about life in gardens.

I have been supported in this work by a generous Australian National University Scholarship. Research funds provided through the Scholarship were supplemented by the Department of Geography, School of General Studies, The Australian National University. The interviewers employed on the study were paid under a grant from the South Australian Department of the Premier and of Development. I am grateful for all of this support.

Ian Halkett.

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PART I

INTRODUCTION

CHAPTER 1

THE GARDEN IN THE CITY: POLEMICS AND RESEARCH

The Suburban Debate

The future of the residential garden is a central issue in a continuing debate over the most appropriate forms of housing for metropolitan areas. Critics of the suburban form of development -- detached housing on "quarter acre" blocks[1] -- argue that a substantial reduction in garden sizes would permit the planning and development of more efficient and more attractive residential areas. Defenders of the residential garden argue that it is an important adjunct to the dwelling and that it should be retained in new residential development. The debate has been joined by an amazing array of protagonists: architects and planners promulgating their "solutions" to urban problems, economists and geographers urging efficiency, agriculturalists attempting to preserve their land on the urban fringe, agriculturalists attempting to gain high prices for their land on the urban fringe, sociologists seeking social justice, aesthetes offended by apparent disorder, conservationists dismayed by ecological atrocities, and individuals of all persuasions concerned solely with finding the best of all possible worlds. Despite the widespread interest in the debate it has been based almost entirely on the conjectures and predilections of the many protagonists, and conducted in the absence of any body of systematic empirical data on the nature and importance of gardens. This study is an attempt to contribute to the debate by providing basic data on the use and design of residential gardens.

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1. The standard residential block, colloquially known in Australia as the "quarter acre" block, is often smaller than one quarter acre, perhaps one-fifth or one-sixth of an acre, between 600 and 700 square metres. The colloquial usage is retained throughout this study.

A comprehensive history of the suburban debate is beyond the compass of the present study. The discussion in this section is limited to a review of the central issues of the debate, especially as they relate to residential gardens. First, however, it is necessary to define "suburb" and to differentiate between its dictionary meaning and Australian colloquial usage. In its original meaning, and in British and North American usage, a suburb is an "outlying district of [a] city," (*Concise Oxford Dictionary*, 1964:1288) an area of housing at, or even beyond, the recognized or legal limits of a city. The important feature of this usage is that it makes a distinction between the suburbs and other parts of the city; the suburbs may be extensive, occupying more than half of the metropolitan area, but in both lay and technical usage they are differentiated from other parts of the city such as the central business district and inner-city residential areas. In Australian usage, however, a suburb is virtually any recognized part of the city, regardless of its location within the metropolitan area or its predominant land use. Thus a residential area that would be designated as an inner-city area elsewhere could be recognized as a suburb in Australia.

Despite the different spatial and land use connotations that they give the word Australians have adopted the derogatory shades of meaning of the word "suburb" and its derivatives used elsewhere. The adjective "suburban" is sometimes meant to be disparaging when applied to almost anything from architecture to political opinions, implying a kind of homogeneous middle class mediocrity. "Suburbia" can take similar shades of meaning in describing the outlying residential districts of a city or any great aggregations of suburban housing.

Suburban residential development was known as early as the Fourteenth Century in England where, freed by domestic peace from the

constraints of living within city walls, tradesmen and the wealthy moved their homes into the countryside surrounding cities and towns (Taylor, 1973:8). The suburban form persisted in Britain and British colonizers took their preference for houses with gardens with them when they set about building their colonies in North America, Australia and elsewhere. Dutton (1971:240) reports that in Adelaide, the first permanent colonial settlement in South Australia, cottages with gardens were among the first permanent structures built.

Suburbanization in Australia as elsewhere was accelerated by the mechanization of transportation during the Nineteenth and early Twentieth Centuries. Repelled by the crowded and dirty conditions of the cities and freed by the tramway and railway, and later the automobile, from the necessity of living close to employment, large numbers of people began to move to the growing suburbs. A factor in the development of suburbs during this period may have been what Donaldson (1969:100) terms the pastoral ideal in the American context and what Rose (1972:70) calls the rural ethos in Australia. This expressed itself as a yearning for a simpler agrarian past, life as it is romantically imagined to have been lived on the land: if it was impossible to leave the city at least it was possible to move to its fringes and own a plot of land. This idea was reinforced by visionaries such as Howard (1945), who, at the turn of the century, introduced the "Garden City" concept which promoted a compromise between the urban and the rural, offering some of the benefits of each. The detached house on the "quarter acre" block became the standard form of dwelling in this urban-rural *milieu* because it did offer some of the benefits of both worlds -- access to the economic and cultural attractions of the city and to the fresh air and open space of the country.

It is a matter of interpretation whether an identifiable pastoral

ideal or rural ethos was, or is, an influence on the growth and popularity of suburbs; certainly the desire to possess and presumably use a block of land has always been one of the fundamental motivating factors in the choice of suburbs as dwelling places. Whether or not the pastoral ideal is an important factor in the growth of Suburbia, the critics of Suburbia are still looking to the pastoral ideal and judging Suburbia by "the impossibly high standards of a nonexistent utopian past." (Donaldson (1969:8).

By the time the great boom in urban railway building had reached its peak and waned and the automobile was becoming common the suburban house and garden became enshrined in residential zoning by-laws which set standards for minimum allotment sizes in new residential development. These standards were, and are still, set and enforced for a number of reasons. They were intended to safeguard the health and welfare of communities by isolating households from each other, thus hindering the spread of disease, ensuring adequate light and ventilation for each dwelling, and minimizing the risk of multi-dwelling fires. At the same time they were designed to ensure that households had adequate space for domestic functions such as the storage of fuel and septic tank drainage or the accommodation of cess pits. By these standards the community protects property values by preserving the *status quo*, the assumption being that higher density housing may result in degradation of the social and physical environments.

Minimum allotment size standards vary, of course, between cities and between local government areas. A common standard was that adopted in South Australia where the *Building Act* 1923-1964 (Regulations 249-249C), set the minimum area for detached dwelling allotments at 6,000 square feet (557 square metres) in sewer serviced areas, a density, roads

included, of approximately 16 dwellings per hectare.[1] Sustained criticism of the suburban form of development and the pressure of continuous urban growth led to a revision of the *Act* in 1974; the revised Act permits the construction of detached dwellings on blocks of 365 square metres (approximately 4,000 square feet), about 27 dwellings per hectare.

A number of factors have contributed to rapid suburban growth in Australian cities during the last quarter of a century, continuing a long-established Australian trend. Natural growth and sustained migration have led to rapid growth in the population of the industrial cities. General prosperity has ensured that the majority of newly formed households have had resources sufficient to purchase or build a cottage on a "quarter acre" block and to operate the essential automobile. Tradition and preference have led households to seek detached housing, a tendency that is reinforced by the financial security inherent in a detached house and land. Meanwhile the suburban house has been enshrined in minimum block size zoning to such an extent that in Adelaide, as in most Australian cities, the only alternatives to the "quarter acre" block have long been a meagre supply of flats and old terrace houses, many of which were in need of extensive renovation. So the cities expanded with the development of new suburbs through the 1950's and '60's and into the '70's. It is the development of this recent period, which lacks the charm and the architectural-historical interest of housing in older suburbs, that has attracted criticism and generated the suburban debate.

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1. This is a relatively simple density ratio, appropriate for the discussion of residential density where the majority of dwellings are detached or semi-detached. By convention residential and population densities are discussed in terms of a number of different types of ratio, for example: occupancy rate -- persons/habitable room; net residential density -- habitable rooms/unit area; net population density -- habitable rooms/unit area times the average occupancy rate; and gross population density -- persons/unit area over the entire area under consideration, such as a neighbourhood or town. (Keeble, 1969:253, and Winsten and Savigear, 1966.)

The following passage from Freeland (1972:113) embodies most of the elements common to, and the tenor of, much of the criticism of Australian suburbs:

> The Australian character and culture are epitomized in the suburb -- a compulsive gregariousness combined with an aggressive individualism and kept within strict limits of conformity to produce a rather monotonous uniformity having little variation or light and shade. The Australian suburb is monotonous. It has other shortcomings besides its aesthetic flatness; there is little community spirit or activity; travelling times to work, up to three hours a day, are outrageously excessive; large areas lack sewerage, sealed roads and kerbed gutters; many homes have neither reticulated water nor electricity.
>
> The cost in community and personal terms of maintaining the suburban way of life is burdensome. The provision of public utilities, transport and services such as garbage collection is extremely expensive. And the suburban dweller pays for it not only in inconvenience but in hard cash in high contributions to local authorities who struggle to provide utilities and services to widely separated homes, in consequently increased land costs, and in the running of at least one, and frequently two, cars.

There are three principal elements to such criticism of the suburbs. The first is essentially social, stressing the conformity bred in suburbs through the pressure on residents to conform to some implicit set of community standards. It is difficult to imagine a society or a community that does not do this; the problem in Suburbia is persumably that superficial conformity is exacerbated and exaggerated by the highly visible nature of the house and garden. Gans (1967:48) observed the effects of pressure to conform in gardening standards in his study of Levittown, a large housing development in the eastern United States. After moving into a new street Levittown the residents very quickly arrived at an unspoken agreement over the standards to be employed in lawn care; those who attempted to maintain their lawns at above the accepted standard and those who failed to maintain the standard were

"brought into line through wisecracks".

The second major criticism is aesthetic and an extension of the first: suburban conformity results in a monotonous landscape. There are two causes of this monotony, the social instinct to conform and regulations such as minimum allotment size standards. Such standards are part of what Boyd (1971:34) condemns as "naive doctrinaire planning" which at best discourages experimentation and often virtually dictates monotonous repetition of unimaginative formulae.

Finally, suburbs are criticized on a number of economic grounds. Freeland (1972:113) lists a number of these: the wide separation of dwellings increases the costs to the community of providing transport and other services and the individual household, besides bearing a share of these costs, must bear high land and transportation costs and suffer "outrageously excessive" travel times. This criticism implies the assumption that much of the open land around suburban houses is wasted or at least economically unjustified. One of the most forthright statements of this assumption was made in the Adelaide popular press by Chappel (1973:18) who contends that the back garden is "put to no practical use". Chappel argues that the vegetable garden, fowl yard, fruit trees, fuel storage area and privy are no longer essential and that the back garden has become an "unwanted wilderness".

According to critics of Suburbia such as Baldwinson (1965), Fargher and Speechly (1970), Boyd (1970), and Chappel (1973) in Australia and Whyte (1962, 1968), Moe, *et al.* (1968), and Little (1969) in the United States a panacea for these ills of monotony, inefficiency, and waste is to increase residential densities by reducing the size of residential gardens. These proponents of medium density development argue that a reduction in block sizes would reduce the amount of land

required for residential uses and the area that requires servicing, thus achieving savings in land and capital and potentially releasing more land for public or semi-private open space.[1]

Much less has been written in defence of Suburbia than in criticism although most criticisms have been refuted by a few proponents of suburban housing. For example, Harrison (1970:3.5) attacks the conclusion that substantial reductions in the size of cities would result from increases in residential densities. Harrison points out that residential land accounts for only about one-third of the gross area of cities. Significant reduction of the physical growth rate or size of cities would therefore require reductions in the amount of land used for commercial, industrial and recreation activities equivalent to the reduction in residential land. "Why," Harrison asks, "pick on housing?"

Stretton (1970:11) challenges criticism of suburban conformity and the monotony of the residential landscape, contending that "similarity is often and above all a sign of *freedom:* more and more people are at last getting what all of them have always, freely, independently, identically wanted [a suburban house and garden]." If there is monotonous conformity, he maintains, it is the result of a co-incidence of tastes, and that is not inherently bad. Arguing for the "house-in-garden", Stretton (1970:15) lists some of the important functions of the garden: it allows the dwelling to be flexible, many people enjoy gardening, gardens are good places for children to play and they are places where

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1. The intractable political-economic question of who is to control and be responsible for the maintenance of these open spaces must be considered. Proponents of medium-density "open space communities" argue that if private developers are unwilling, and local government authorities unable, to assume responsibility for the open land, community or homeowners associations can be established to share maintenance costs. (Little, 1969:52-53).

parents can keep an eye on children without leaving their household chores or pleasures, and they provide a venue for activities that cannot be undertaken elsewhere. Taylor (1973: Chapter 4) puts forward arguments similar to those of Stretton in defence of suburban housing in Great Britain.

Stretton's arguments are diametrically opposed to those of Chappel and other medium density proponents and comparison of the two viewpoints neatly summarizes the suburban debate. The residential garden is the central issue: is it a waste of land as the proponents of medium density assume, or an important adjunct to the home as its defenders assume? The two views are so radically different and the question so crucial it is surprising the question has been subjected to very little empirical analysis. Yet to date insufficient research has been undertaken on the nature and importance of gardens to lift the debate above the level of a clash of contradictory assumptions.

Empirical Studies of the Residential Garden

Empirical precedents for the present study are few and limited in scope. In the rapidly growing multidisciplinary body of urban literature many studies touch on the dwelling and garden, especially studies concerned with housing economics, housing standards, the processes of development, and residential location, but few present any systematic data on the nature and use of residential gardens. Studies presenting data on garden use and design can be grouped into two broad categories: studies initiated for the specific purpose of examining aspects of garden use or design and studies that have yielded data on gardens as part, usually a very small part, of a larger undertaking. The two principal *genres* in the latter category are behavioural studies and

studies of the quality of the urban environment.

Garden-Specific Studies

Garden-specific studies can, in turn, be divided into three categories: general studies which undertake a broad examination of the use and design of the gardens associated with a range of housing types, studies which examine the use and design of gardens associated with a particular type of housing, and studies which examine a particular aspect of garden use or design.

General Studies. Three researchers, all architects, have undertaken comprehensive studies of garden use and design in Australia. In 1964 Saunders used an interview questionnaire to examine the use and design of a sample of 424 Melbourne gardens. The aims of Saunders' study were somewhat similar to those of the present study: in light of a growing interest in medium-density development he wished to examine relationships between garden use and design and family structure and the size of residential blocks. Saunders questioned his respondents on garden maintenance, the design of their gardens, and on the use of gardens for various activities. Unfortunately Saunders lacked the facilities for analyzing his data and the study has never been completed nor the data published.[1]

At about the same time, and also in Melbourne, Bayly undertook a study of suburban residential space. Bayly included in his questionnaire a number of questions similar to those asked by Saunders on the use and design of gardens. The results of Bayly's survey have never been

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1. Personal communication: David Saunders, Power Institute of Fine Arts, University of Sydney, Sydney, Australia.

published.[1]

Difficulties similar to those experienced by Saunders overtook Ward (1970:5) and an Architectural Research Group in Adelaide who used an interview questionnaire to "investigate the suitability of present [low density] patterns of suburban housing to the true needs of various segments of the population." The Group's questionnaire, which was successfully administered to 175 households, included a number of questions on the design and maintenance of residential gardens, on the use of gardens for recreation, and on attitudes towards gardens and gardening. Like Saunders the Architectural Research Group lacked facilities for analysis and only the first tabulations of their data have been printed for limited distribution.

Studies of Gardens in Particular Housing Types. Studies of this type have been limited, like the two cited here, to investigations of the small gardens of medium-density or row housing. Pollard (1968), in an unpublished planning thesis, examines the use made of their private open space by residents of a number of types of medium-density dwelling in Sydney. Pollard used an interview questionnaire to inventory the use of medium-density courtyards and concluded that the use of gardens and satisfaction with the amount of privacy both increased as the amount of private open space increased.

Pollard's conclusions were not corroborated in a survey by Cook (1968) of attitudes toward and use of gardens on seven housing estates in England. Cook's data show no significant relationship between the size of gardens and their use for sitting out, gardening, or hanging out

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1. Personal communication: John J. Bayly, Loder and Bayly Consulting Engineers and Planners, Melbourne, Australia.

washing. Of the activities that Cook examined only children's play was sensitive to the sizes of gardens -- small gardens were used less for children's play than were larger ones. Cook's data show no relationship between the size of gardens and attitudes towards privacy; Cook concludes that within the range of garden sizes included in the sample space is not a substitute for screening in providing privacy.

Cook (1968:219) recognizes that studies of the gardens of single housing types are limited because they do not permit comparison with other types of garden. The ranges of garden sizes included in the Cook and Pollard studies are extremely limited in comparison with the ranges of garden sizes in the urban areas where they were working and their conclusions on the relationships between attitudes towards gardens, their uses, and the space available are valid only insofar as they contribute to the design of medium density gardens. In the absence of comparative data they contribute little to a general discussion of garden use and design.

Studies of Particular Aspects of Garden Use or Design. This category includes several studies in a variety of disciplines that have in common only their treatment of residential gardens. Best and Ward (1956) reviewed several studies of the use of residential gardens for food production in Britain, examining the amount and value of food produced in gardens and attempting to estimate the proportion of the nation's food requirements produced in gardens and the productivity of gardens compared to that of agricultural land. Best and Ward concluded that, at the time of the study, the value of food production on residential land compared favourably with that on agricultural land. Cook (1968:217) suggests that a gradual waning of gardening enthusiasm took place between the time of the Best and Ward study and 1968.

In the United States sociologists Meyersohn and Jackson (1958) compared gardening activities and attitudes towards gardening in two suburbs of Chicago, one of high and one of low socio-economic status. Edney (1972), a psychologist, examined territoriality and property defence by comparing the reactions to intrusion of a sample of householders who defended their properties with warning signs with the reactions of a control sample which did not. Kaplan (1973), also a psychologist, investigated the psychological benefits of gardening by comparing the behaviour and attitudes of gardeners in home gardens with those of gardeners in communal gardens.

Several studies have been published on the botanic structure of food-producing dooryard gardens in tropical and subtropical countries. Simoons (1965) compares northern and southern Ethiopian gardens, examining the relationships between the plants cultivated and the cultures and religions of the two regions. Kimber (1966 and 1973) examines the dooryard gardens of Martinique and Puerto Rico. In her Puerto Rican study, Kimber identifies six garden design types which she concludes are an effective index of traditionalism and economic well being. Wilhelm (1975) describes six types of dooryard garden in a rural black community in Texas and discusses the decision making processes involved in establishing a vegetable garden. The cultures and economic systems of Puerto Rico and Texas are so dissimilar from those of suburban Australia that comparison of the design types identified by Kimber and Wilhelm with those identified in the present study would be of little value.

Finally, Hewat (1973), in an unpublished honours thesis in geography, examines attitudes towards front gardens in Canberra where local legislation prohibits the erection of front fences and hedges.

Hewat documents the various forms of subterfuge used to circumvent the prohibition against fences, and also assesses the attitudes of children towards private property in the absence of fences. Her study is significant because she used sustained observations of behaviour in conjunction with an interview questionnaire. This is probably the only time in Australia when systematic observation has been used to collect data on behaviour in gardens.

Non-Garden-Specific Studies

Behavioural Studies. Behavioural studies in geography and other social sciences are a loose-knit group of research approaches which attempt to describe the behaviour of individuals or groups and the motivations or attitudes that underlie patterns of behaviour, and then to formulate statements about the behaviour of groups and individuals. The behavioural approach in geography is distinguished, at least nominally, from that of other disciplines by the emphasis geographers place on spatial behaviour and on the spatial implications of particular types of behaviour. Golledge, Brown and Williamson (1972), in a review of behavioural approaches in geography, identify five major types of study: decision making and choice behaviour, the diffusion of information, search and learning, political behaviour, and perception. To this list of familiar research approaches might be added time allocation studies although this approach has, as yet, been little investigated by geographers. Studies of this type, which examine the use of time by individuals and attempt to model behaviour in temporal as well as spatial terms, have been undertaken by Chapin and Hightower (1965 and 1966), Bullock, *et al.* (1971), Parkes (1972), and Brail and Chapin (1973). Time allocation studies can be regarded as a subset of decision making and choice studies.

Studies which employ the classic behavioural approaches have yielded little data directly relevant to studies of garden use and design. Decision making studies of residential location indicate, by implication, that home-seekers take the size and type of garden into consideration in selecting a home or a home site. Johnston (1971:322-324) suggests that the choice of a home is governed by two sets of major influences. The first is the desire for a pleasant physical and social environment. For example, Daly (1970:3.67), in a study in Newcastle, New South Wales, found that a natural bush setting was desired by some home seekers. The second set of influences identified by Johnston concern the individual dwelling: households will select dwellings which fit their requirements, particularly their space requirements. Presumably these requirements include garden space as well as space within the dwelling.

Although they have enormous potential for documenting garden use, time allocation studies have so far contributed little data of value in garden studies. In a study of time and urban social structure Parkes (1972) considers the time spent at recreation activities away from home and the time spent watching television and listening to the radio but not the time spent on other recreation activities in the dwelling or garden. Chapin and Hightower (1965 and 1966), in a study of activity systems in Durham, North Carolina, included recreation in the garden and maintenance of the garden in their questions on discretionary activities but these are not specifically mentioned in the analysis and they give no reasons for excluding these activities from their discussions. Brail and Chapin (1973) do not mention the garden in their analysis of a nation-wide study of time allocation in the United States. Garden use is reported in an ambitious study of the daily activity patterns of samples of urban and suburban dwellers in eleven European

countries and the United States edited by Szalai (1972). Unfortunately the data on garden use are of little comparative value because the diaries used to collect the data were not administered during a single season. In the United States, for example, interviewing took place in the late autumn, stopped during the winter, and resumed through the early and middle spring. Consequently, as Converse (1972:65) points out, in a review of the survey design of the study, there were strong correlations between the time that the interviews were conducted and participation in gardening, which he dismisses, together with walking, as a "minor activity".

Quality of the Urban Environment Studies. In an effort to ascertain the needs and preferences of urban populations researchers in Australia have recently undertaken a number of studies of urban dwellers' attitudes toward and perception of their local environments. These include Devine's (1968) unpublished study of two Sydney suburbs, Troy's (1971 and 1972) studies of four suburbs in Sydney and four in Melbourne, King's (1972) study of Yass, New South Wales, and Stimson's (1971) study of Adelaide. Quality of the environment studies attempt to assess the attitudes of residents of particular areas toward a wide range of environmental variables -- including the quality of housing, the convenience of the neighbourhood, pedestrian and traffic safety, and the existence and severity of pollution -- and to interpret these attitudes in the context of the characteristics of the area and the circumstances of the respondents. Researchers working in this field must contend with the difficult problems of measuring attitudes and must take into account the considerations that the concept of environmental quality changes with time and varies between value systems, between life styles and between ethnic and class groups (Rappoport, 1970b:15).

Like the behavioural studies, most studies of the perception and evaluation of environmental quality have not included attempts to systematically describe garden use. An exception is Devine's (1968) study in which the author used a questionnaire and a series of drawings of street environments to assess the relationships between the use of gardens and attitudes towards existing and preferred street environments in a low socio-economic status suburb of terrace housing and an upper-status suburb of detached housing. Devine (1968:25 and 70) found that large gardens were used more for gardening, outdoor entertaining, playing with children and vehicle maintenance than small gardens but households with small gardens used their gardens more for "watching people go past".

Several studies have presented material of interest on garden design and maintenance and on attitudes toward residential density. In his Melbourne study, Troy (1972:147) cautiously speculates that the size of gardens is not an important factor in householders' satisfaction with their dwellings. Troy concludes that dwellings with smaller gardens could be attractive provided that "they were large enough, cheap, and had privacy from neighbouring dwellings".[1] The conclusion that the size of gardens is an unimportant factor is not supported by the findings of Stimson and Cleland (1974:12) who used Guttman Scalogram analysis to examine the potential acceptance (by respondents from four distinct socio-economic groups in Adelaide) of seven residential types, ranging

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1. Unpublished data on the amount paid (per square metre) for residential blocks in inner and outer Melbourne suburbs suggest that the amount of space in blocks in outer suburbs is not important above the traditional "quarter acre" size. Buyers will pay more for larger than average sites in inner suburbs but in outer suburbs the incremental amount paid for larger than standard blocks is not significant. (Personal communication: Ken Johnson, Department of Geography, School of General Studies, the Australian National University, Canberra.)

from Radburn development to multi-storey flats. Factor analysis of their data by Stimson and Cleland showed residential density to be the most important factor in the evaluation of housing types.

King (1972:98), in his study of residential quality in Yass, found different garden tastes among residents of different standards of housing. People living in low standard dwellings did not like greenery around their dwellings and preferred an austere orderliness in their surroundings. People living in better quality housing generally preferred greenery and a certain amount of clutter in their gardens.

The importance of the garden as a highly visible element of the residential environment is shown by Morris and Mogey (1965:8) who studied the resettlement of slum dwellers in a new village near the English university community of Oxford. They found the majority of complaints about damage in the new community concerned not the dwellings but the gardens and the greatest concern was expressed not by the residents themselves but by the local government authorities who insisted tenants of public housing should either maintain their gardens or pay the council for upkeep.

Empirical studies of man in the urban environment -- quality of the environment studies, for example, and most studies of aspects of individual or group behaviour -- have a common reliance on a few basic methods of collecting data. Principal among these is the questionnaire which, whatever its form and the method of its administration, is simply a device for systematically asking a large number of respondents the same questions. The second method is the observation of behaviour, a method often involving a very high cost. Both methods inevitably bear the subjective imprint of the research worker who is generally a member of an academic or intellectual elite. It is this person who asks the

questions, makes the observations, and interprets the results. Troy (1972) recognized this problem -- which is one of the most difficult faced in the social sciences -- and compared residents' assessments of four Sydney suburbs with the assessments of members of an elite, a group of planning students. In the present sutdy an attempt is made to minimize the effects of this problem by using two principal methods of collecting data, an interview questionnaire and aerial photographs.

The Present Study

The present study is designed to contribute to an understanding of the residential garden, an important element in the suburban landscape and, despite its familiarity, a virtual *terra incognita* in terms of systematic documentation. "Understanding gardens" implies two things. On one level it can refer to aesthetic appreciation. In the case of the residential garden and the suburban landscape aesthetics assume considerable importance because the suburban landscape is criticized for its monotony and this criticism used as a basis for proposing widespread changes in residential architecture. Aesthetics are highly subjective, of course, but the criticism of monotony can be tested with data on the physical layout of the parts of gardens both visible from the road and hidden from public view. Perhaps more important, the design and maintenance of gardens -- the principal bases for aesthetic judgments -- can be examined in terms of both the use made of gardens and the characteristics of households. On a second level understanding the landscape implies knowledge of the functions of the various elements of the landscape and the relationships among them. Much of our "knowledge" of the use of residential gardens is based on casual observation and personal experience. Comments based on intuitive judgments may be valid, but a number of important questions about the type and the intensity of

use made of the open portions of blocks by members of different types of household can be answered only with systematic empirical data.

In pragmatic terms the data presented in this study may assist decision makers to determine appropriate mixes of residential densities for new communities: decisions which should be based on knowledge of the ways gardens of various sizes are used by different types of household. If residential densities are to be increased -- perhaps for reasons beyond any consideration of the amount of private open space households need or want -- the data presented in this study should help planners in Adelaide anticipate the effects of these changes on the individual household and on the demand for public facilities. Similarly, if residential densities are to be increased these data should provide designers with an indication of how to make effective use of whatever open space may be available in the construction of new housing.

While the foregoing review of studies discussing residential gardens is not exhaustive it is representative and it shows that the precedents for the present study are limited. The present study is, of course, a general garden-specific study, and no study of this type has previously been successfully completed in Australia. All of the other studies discussed are limited, for the purposes of comparison with the present study, by the fact that they are restricted to particular types of suburb (Devine and Meyersohn and Jackson), to particular housing types (Pollard and Cook), or to particular aspects of use or design (Best and Ward, Edney, and Kaplan). Even where comparison between the data collected for the present study and previously published data should be possible opportunities are often limited by the form and presentation of the earlier data. For example, Ward (1970:6) uses undefined phrases such as "a little" and "a moderate amount" in describing the amount of

"spare time" spent gardening, and Devine (1968:68) discusses garden activities in terms of whether they were undertaken "often" or "sometimes". The present study employs, wherever possible, standard units of measurement such as hours, and descriptive terms are defined to permit comparison of the present data with data collected for future studies of garden use and design.

Methodologically the present study is distinguished from all previous studies of residential gardens by the use of aerial photographs to supplement data collected with an interview questionnaire. With the exceptions of the field biogeographic studies of Kimber and Simoons and the use of systematic observation by Hewat to supplement her questionnaire all previous studies of gardens have relied on questionnaires and, in most cases, casual observations by interviewers, or, in the case of time allocation studies, on self-administered diaries. Although the potential value of small scale aerial photographs in urban studies has been discussed by Green (1955), Wellar (1967), and Moore and Wellar (1968) they have seldom been used in urban research and they have never been used in studies of residential gardens. Besides yielding extensive data on the design of gardens the photographs provided a means of checking the questionnaire data for bias.

The questionnaire developed for the study is more elaborate than those previously employed in garden-specific studies.[1] It elicited data on the size, structure, and economic status and ethnic background of households, the age and size of dwellings, the design of gardens and the design preferences of respondents, the frequency and duration of garden use for various activities by the members of households, the use of venues other than the garden for recreation activities that can be

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1. The questionnaire is presented in the Appendix, pp. 203-216.

carried out in gardens, the amount of time spent working on the garden and attitudes towards gardening, and problems -- such as disturbance by noise and lack of privacy -- encountered in the garden. Together with the photos these data provide a comprehensive description of the sampled households, the gardens they occupy, and their use of their gardens.

CHAPTER 2

THE PROVISION OF GARDEN SPACE IN THE PRINCIPAL FORMS OF HOUSING

The critical differences between traditional forms of housing and the "new" medium-density forms lie in the extent of private open space. In introducing a discussion of the implications of these differences, in terms both of the individual household and of the residential landscape, it is necessary to describe the scale and nature of the garden space associated with the major forms of housing. The traditional forms of housing are limited to four basic dwelling types: detached houses, semi-detached houses, terrace houses, and flats. The new medium-density forms include several types of housing: villa units, townhouses, cottage units, and cottage flats. The discussion here is limited to examples of medium-density forms in Adelaide which provide households with private open space.[1]

Table 2.01 shows the occurrence of the various forms of private housing in the Adelaide Statistical Division at the Census of 1971.

The Traditional Forms of Housing

Detached Houses

The detached house, free-standing on a "quarter-acre" block, is

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1. The nomenclature of medium-density housing requires rationalization. Architects and estate agents use various terms to describe medium-density dwellings, presumably in attempts to imply that their products have certain status, and often these terms provide little insight into the particular types of housing under discussion. In the 1971 Census (Bureau of Census and Statistics, Vol. 7.4, 1971: xviii) the term "villa unit" is used to describe dwellings that are variously known as villa units, town houses, cottage units, villa developments, and cottage flats. In the 1971 Census form (*ibid.*:xi) this type of housing is described as "One of a group (three or more) of single or double storey homes separate or joined together in sets of 2 or more *all occupying a common block of land.*"

TABLE 2.01

CLASSES OF OCCUPIED PRIVATE DWELLINGS,
ADELAIDE STATISTICAL DIVISION, 1971

Class of dwelling	Number	Percentage of total dwellings
Separate house (detached)	192,030	76.5
Semi-detached house	24,792	9.9
Self-contained flat	14,962	6.0
Villa unit (medium-density)	12,642	5.0
Non-self-contained premises	2,389	0.9
Attached house (adjoining shop)	2,251	0.9
Terrace house	1,442	0.6
Caravan	555	0.2
TOTAL	251,063	100.0

Source: Bureau of Census and Statistics. *1971 Census of Population and Housing*, Vol. 7.4, p. 99.

the principal form of housing in Adelaide and the form that has generated the criticisms that Suburbia is wasteful of land, inefficient for transport and servicing, and monotonous. Houses and blocks vary in size, of course, but a typical detached house is between 100 and 140 square metres (1,000 and 1,500 square feet) in plan and occupies one-fifth to one-quarter of a block of land with an area of 560 to 690 square metres (6,000 to 7,500 square feet). The configuration of the garden space is a function of the size and shape of the residential block, the size and shape of the dwelling, and the regulations governing the siting of the dwelling within the block. It is most common to have the dwelling set back a minimum of 7.6 metres (25 feet) from the street alignment and a minimum of 4.6 metres (15 feet) from the side boundaries of the block.

The dwelling is thus located towards the front or street end of the allotment, with the back garden larger than the front and narrow gardens or passages on either side of the dwelling. Typical arrangements are illustrated in Figure 2.1A and Plates 2.1 and 2.2. Because each block has private open space between the dwelling and the street the landscape created by aggregations of detached dwellings is considerably influenced by the design and maintenance of private gardens.

The size of residential blocks, their shape, the size of dwellings, and the siting of dwellings within blocks are all controlled by the State *Building* and *Local Government Acts* and by local government by-laws intended to ensure the health and safety of the community and to preserve amenity rather than to ensure that households have adequate or suitable garden space. The sizes of gardens and their configurations are therefore largely fortuitous, or infortuitous in the eyes of the critics of Suburbia, results of pragmatic considerations, the results of what Boyd (1971:31) calls "naive doctrinaire planning". As an alternative to this means of determining garden sizes Keeble (1969:261) suggests that garden sizes could be determined by the use that households make of them. He proposes three basic garden sizes: a quarter acre garden (1011 square metres) "which requires quite exceptional keenness on the part of the owner or some paid help"; a garden of one-sixth to one-eighth of an acre (505 to 675 square metres) which can be maintained by a "reasonably keen" gardener; and an "ordinary" garden of one-twelth of an acre (337 square metres) which can be easily maintained.[1] Keeble concludes by noting the obvious: land not required for gardening is not

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1. Keeble's "ordinary" garden is somewhat smaller than the 400 to 600 square metres of private open space in the standard residential block in Adelaide, indeed his second category closely approximates the garden sizes associated with detached housing before the 1974 change in the *Building Act* (Regulations 249-249C).

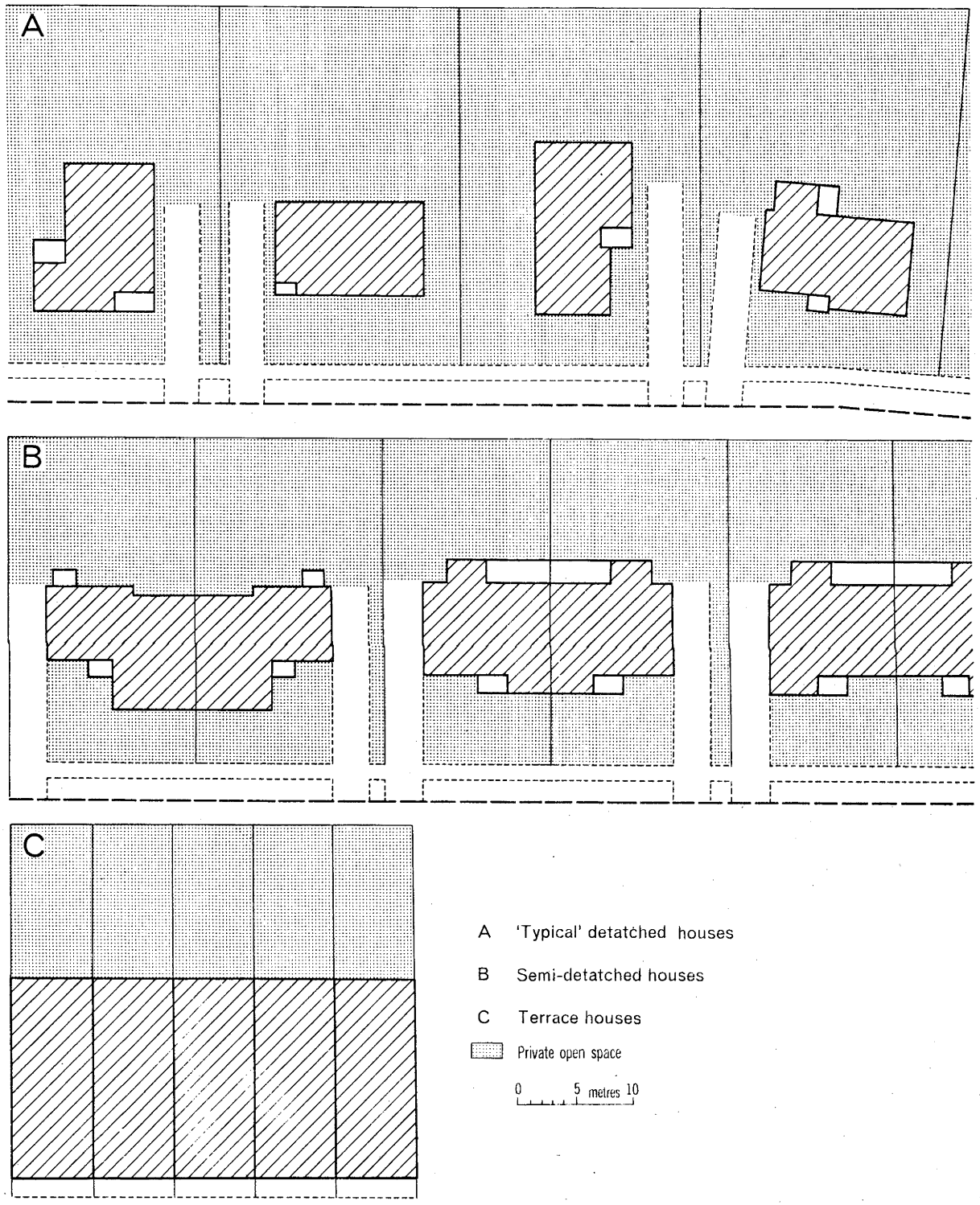

Figure 2.1 The traditional forms of housing

Plate 2.1. Detached houses in an inner suburb, Vale Park, Adelaide. (Photo: R. Cheesman.)

Plate 2.2. Detached houses in a developing suburb, Happy Valley, Adelaide. (Photo: R. Cheesman.)

wasted because it can be used for recreation and play, and lawns and shrubs can be planted where intensive gardening is not undertaken.

Semi-Detached Houses

The semi-detached house, or duplex, differs from the detached house in two respects. First, as its name implies, it shares a common wall, or party-wall, with a second and usually identical dwelling. Second, individual semi-detached dwellings generally occupy allotments that are smaller than the "quarter acre" blocks of detached housing. A 110 square metre semi-detached dwelling has 300 to 400 square metres of garden space. The regulations that govern the size and siting of semi-detached dwellings are very similar to those that govern detached dwellings and the configuration of the garden space about semi-detached dwellings and the landscape created by aggregations of this type of housing are much like those of detached dwellings. Semi-detached dwellings are illustrated in Figure 2.1B and Plate 2.3.

Terrace Houses

Very little terrace or row housing, the traditional form of medium-density, has been constructed since detached housing became widely accessible; consequently this form of housing is associated almost exclusively with inner-city and older residential areas in Adelaide Terrace houses share walls with dwellings on both sides and are usually built to within 2 metres of the street alignment. The garden space in terrace housing is limited, therefore, to an enclosed area of 100 to 120 square metres at the back of the dwelling and sometimes a small border or planter between the verandah and the street. Because terrace or row houses are generally built to the street alignment and have no side gardens the landscape that they create contains little vegetation except

Plate 2.3. Semi-detached houses, Seaton, Adelaide.
(Photo: R. Cheesman.)

Plate 2.4. Terrace houses, North Adelaide. (Photo: R. Cheesman.)

in the private back gardens and offers its inhabitants little opportunity to influence the landscape of the street through their gardening activities. Terrace houses are illustrated in Figure 2.1C and Plate 2.4.

Flats

Flats differ from the other types of housing in their lack of private open space, with the exception of balconies which are privately accessible but seldom visually private. Flats, and especially multi-storey flats, generally have been conceived and built as a means of increasing residential densities and saving land. As criticisms of Suburbia gained acceptance in Australia planners in the public housing authorities in some states experimented with this "solution" to the problem of housing rapidly growing urban populations. In many instances the results of their experiments have been tragic, as Jones (1972:Chapter 5) and K. Johnson (1972) point out, and this form of housing has been largely discredited. One of the major criticisms that has been made of flats is that they do not provide households with private open space. Jephcott (1971:129), in a study of multi-storey housing in Great Britain, concludes that flats are unsatisfactory for families with small children, that flats have none of the "handy neutral areas" such as gardens which permit neighbours to observe each other, and that flats restrict tenants' opportunities for various types of activity and self expression. Many flats are set in areas of communal open space but Jephcott (1971:128) questions whether "the large, open expanses of grass, concrete and tarmac ... [have] much intrinsic value for the flats' own population or the community at large".

The failure of flats provided an additional impetus for the development of medium-density housing.

The Medium-Density Forms of Housing

The medium-density forms of housing provide individual households with substantially less private open space than is normally associated with detached and semi-detached housing. As the summary in Table 2.02 shows, contemporary medium-density housing provides between six and forty-five per cent of the private open space normally available with standard detached and semi-detached dwellings. In order to compensate for the limited private open space large medium-density developments, such as those illustrated here, offer residents communal open space in the form of recreation areas, playgrounds, and access pathways. Three types of medium-density housing, all designed by or for the South Australian Housing Trust, are illustrated in Figures 2.2 to 2.5 and Plates 2.5 and 2.6. The private open space associated with individual dwellings in the three examples ranges from 35 square metres in some of the villa flats to 240 square metres in some of the dwellings designated as "medium-density housing" by the Housing Trust. The medium-density houses (Figures 2.2A and 2.3) have court-yards in the rear and sometimes a smaller service court at the side; the dwellings face the street or the communal open space. The terrace-type medium-density dwellings (Figures 2.2B and 2.4) have two court-yards, one at the front of the dwelling and the other at the back. Access to the common open space is through the back court-yard. The design of the villa flats (Figures 2.2C and 2.5 and Plates 2.5 and 2.6) is much like that of the medium-density dwellings except the court-yards are generally smaller and they do not have service courts. In each of these examples the landscape, as it is viewed from the street or from the communal space, is largely the creation of the architect.

In designing private open spaces in medium-density developments

TABLE 2.02

SUMMARY OF OPEN SPACE PROVISION IN MAJOR FORMS OF HOUSING: ADELAIDE, SOUTH AUSTRALIA

Housing Type	Type of private open space	Area of private open space (square metres)	Type of community open space associated with housing
"Traditional" Types			
Detached housing - "quarter acre" block (Figure 2.1A and Plates 2.1 and 2.2)	Front open or enclosed by low fence, enclosed back	400-600	None
Semi-detached housing (SAHT) (Figure 2.1B and Plate 2.3)	Same as detached	300-400	None
Terrace housing (Figure 2.1C and Plate 2.4)	Front abuts street, enclosed back	100-120	None
Flats	None	None	Variable with design, often none
Medium-Density Types			
Medium-density housing (SAHT - West Lakes) (Figures 2.2A and 2.3)	Front open to community space or street, one or two enclosed courts	50-240 Variable with size of unit and siting	Landscaped walkways providing access and community space and playgrounds
Terrace-type (SAHT - Manitoba) (Figures 2.2B and 2.4)	Enclosed courts front and back	60-70	Communal open space including playgrounds
Villa flats (SAHT - Marden) (Figures 2.2C and 2.5 and Plates 2.5 and 2.6)	Front open to community space, enclosed court back	35-90 Variable with siting	Landscaped walkways providing access and community space

SAHT - South Australian Housing Trust, local names refer to specific design types presently occupied or under construction.

Sources: SAHT; Hanniford and Associates, Architects; cadastral maps; and aerial photographs.

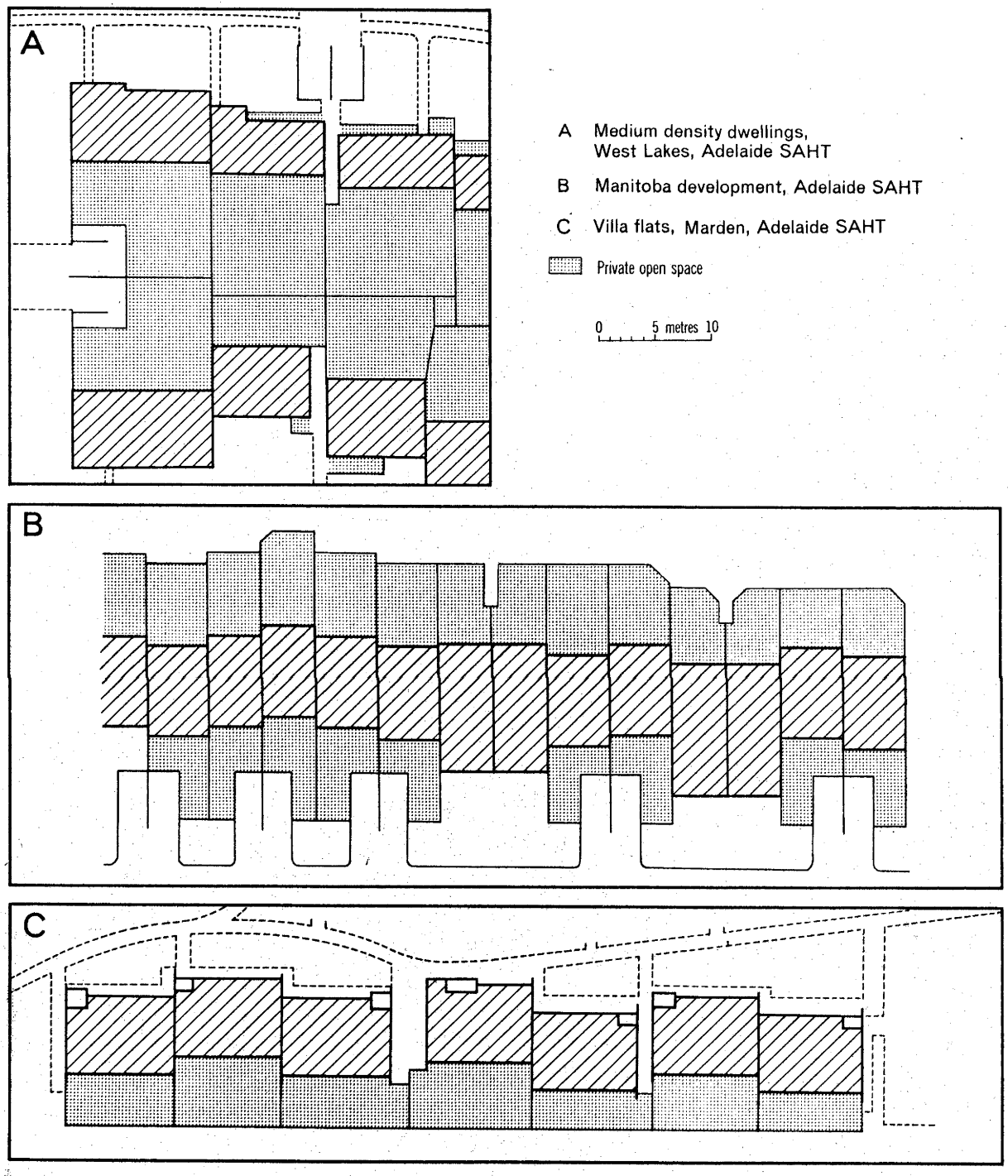

Figure 2.2 Examples of medium-density housing

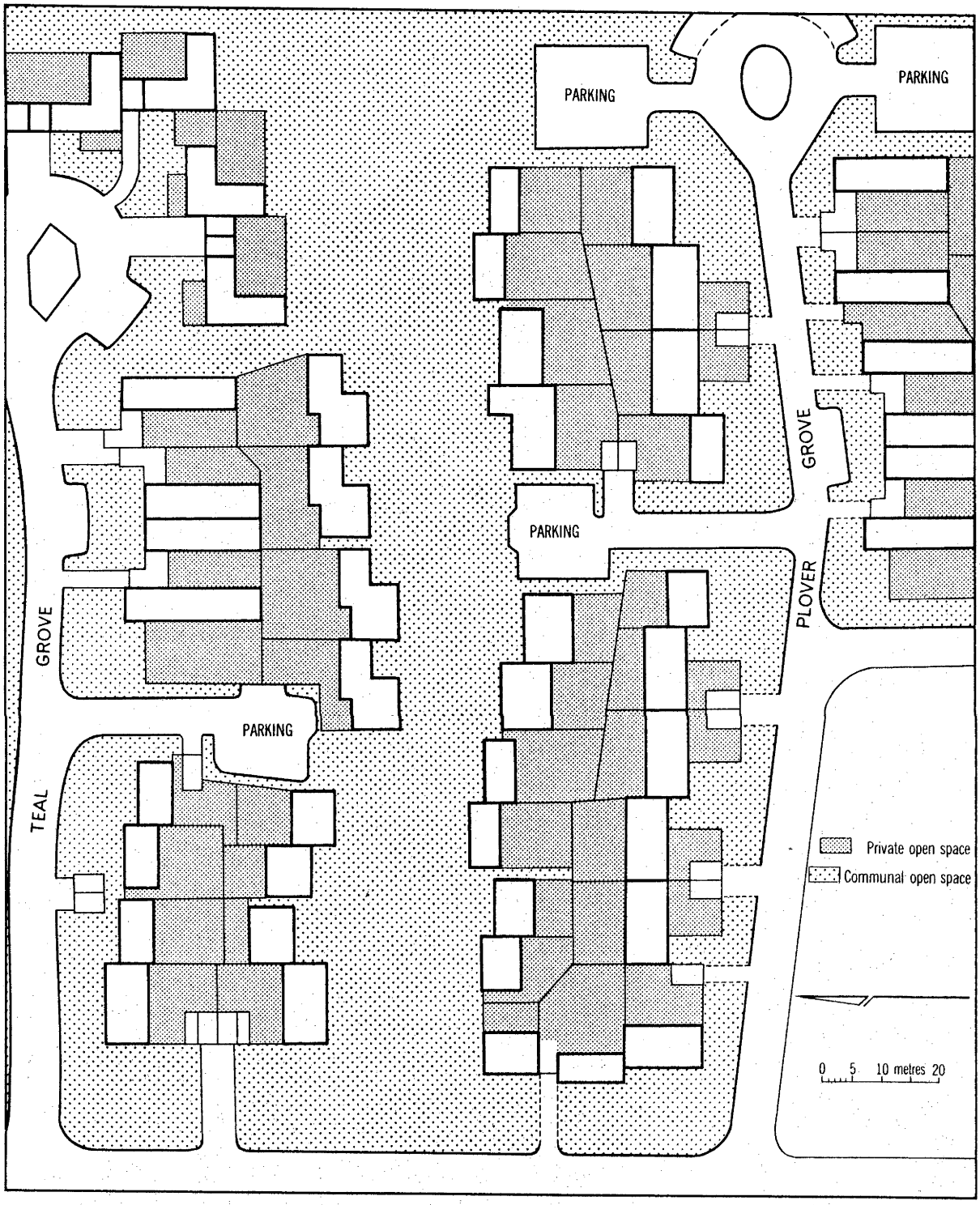

Figure 2.3 Plan of medium-density development, West Lakes, Adelaide SAHT

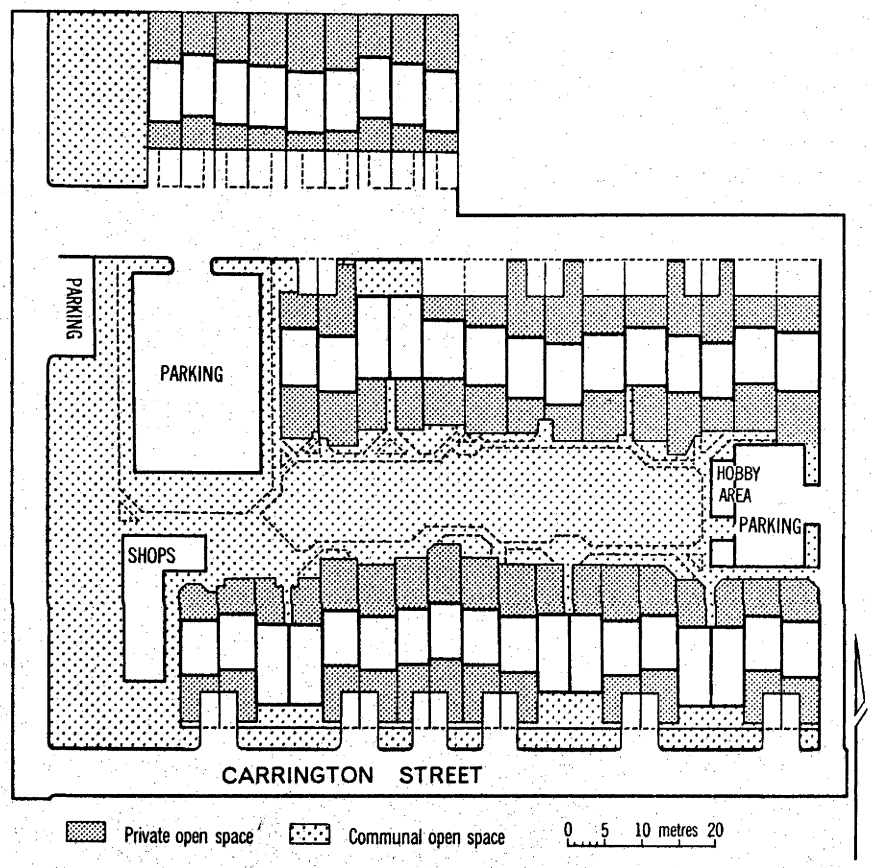

Figure 2.4 Plan of terrace-type medium-density development, Manitoba, Adelaide, SAHT

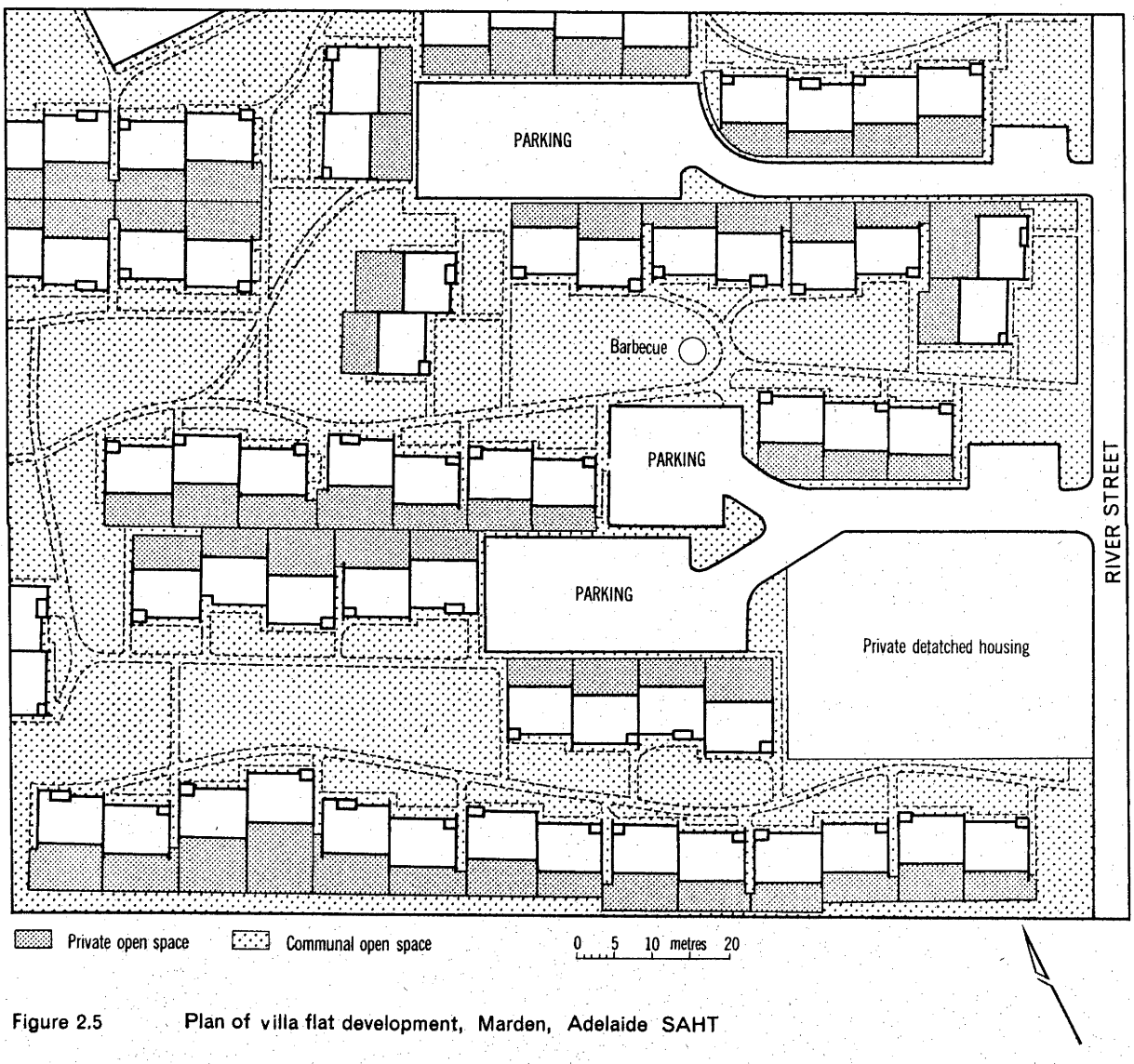

Figure 2.5 Plan of villa flat development, Marden, Adelaide SAHT

Plate 2.5. Medium-density villa units and community open space, Marden, Adelaide. The wooden fence encloses a private court-yard. (South Australian Housing Trust.) (Photo: R. Cheesman.)

Plate 2.6. Landscaping of the community open space, Marden villa unit development, Adelaide. The barbeque is provided for the use of residents of the development. (Photo: R. Cheesman.)

planners and architects are not constrained by the same plethora of regulations that govern the design of detached and semi-detached dwellings, neither have they the benefit of established practice, nor the guidance of systematic empirical research. To a considerable extent, therefore, medium-density housing is experimental and in planning the open spaces designers make a number of assumptions. For example, in designing the medium-density housing shown in Figures 2.2A and 2.3 the designers made "as intelligent a guess" as they could and assumed that 111 to 185 square metres (1,200 to 2,000 square feet) of private open space was sufficient to accommodate a service area and an outdoor living area that provided visual privacy and that could be used in whatever way the household wished. Ultimately, however, the size of the court-yards was determined by the siting of the houses within the development.[1] It appears that similar considerations affected the sizes of the court-yards in the villa-flats illustrated in Figures 2.2C and 2.5 and Plates 2.5 and 2.6 where the alignments of the dwellings were staggered to obtain an attractive visual effect from the communal space. The two court-yards in the terrace-type medium density dwellings illustrated in Figures 2.2B and 2.4 are the result of a conviction on the part of the designing architect that the minimum acceptable private open space provision in medium-density housing is two court-yards, each at least 400 square feet (37 square metres) in area.[2]

Medium-density dwellings have been built in increasing numbers since the mid-1960's. At the Census of 1966 medium-density dwellings were so rare that they were not identified in the Census; by 1971 they accounted for 5 per cent of the private dwellings in the Adelaide

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1. Personal communication: John D. Lawrie, Development Architect, South Australian Housing Trust, Adelaide, Australia.

2. Personal communication: Ian Hanniford, Hanniford and Associates, Adelaide, South Australia.

Statistical Division (Table 2.01). This growth in medium-density dwellings has been encouraged by continuing criticism of Suburbia, by inflated land costs, by the revision of the South Australian *Building Act* to facilitate building at higher residential densities, and by South Australian Housing Trust policy. It seems likely that this growth will continue unless medium-density housing is rejected in the market place, or, in the case of public housing, unless it is subjected to the kind of public criticism that has discouraged the construction of multi-storey flats.

CHAPTER 3

SAMPLING PROCEDURES AND THE COLLECTION AND ANALYSIS OF THE DATA

The Selection of Adelaide as the Study Area

The selection of Adelaide as the study area was based on two principal considerations. The first was the size of the city. As capital and primate city of South Australia, Adelaide is sufficiently large to offer the wide diversity of dwelling and household types of a large metropolitan centre yet small enough to be realistically surveyed using a logistically feasible sample. The second consideration was the fact that most of the residential development in the city has occurred on a flat or gently rolling coastal plain, consequently there was no need to take the slope of blocks into account in the analysis of garden use and design. Had the study been conducted in an area with rugged topography, such as parts of residential Sydney, it would have been necessary either to exclude sloping blocks from the sample or include an examination of the effects of slope on the use and design of blocks, a discussion which would have considerably complicated the analysis.

The Sampling Procedures

The selection of gardens and households for study was random and was carried out in two stages. In the first stage fifty runs, each four street blocks in length (approximately 800 metres and including an average of twenty-four dwellings) were selected for aerial photography. Fifty runs were nominated because it was found, on the basis of experimental photography, that this number was a practical objective for one day's flying. In order to ensure that the sample was as representative as possible the number of private dwellings with gardens in each Local

Government Area was calculated as a percentage of the population of private dwellings with gardens in the Adelaide Metropolitan Area and the fifty runs distributed between the Local Government Areas according to these percentages. Thus if a particular Local Government Area had 6 per cent of the private dwellings with gardens it would be assigned three photograph runs. The distribution of the aerial photograph runs is shown in Figure 3.1.

Having nominated, for each Local Government Area, from one to three aerial photograph runs, a grid was laid over a map of each Local Government Area and random numbers used to locate a point and nominate a direction (basically north-south or east-west modified according to the orientation of the street grid) within the grid. This point then became the centre point of a run of photographs along one side of the nearest street running in the appropriate direction. If the starting point fell outside residential areas the starting point was rejected and the procedure was repeated. One thousand and fifty-eight dwellings and gardens were photographed in forty-five runs (the reasons for the loss of five of the nominated runs are discussed below) and 50 per cent of the households in each run were randomly selected for interviewing.[1]

The sampling, data collection, and location and accuracy checking procedures are summarized in Figure 3.2.

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1. The calculation of the number of aerial photograph runs to be assigned to each Local Government Area was done in the basis of the 1966 Census (Bureau of Census and Statistics, *1966 Census of Population and Housing*. Vol. 4.4:242) but maps published in 1971 were used for the selection of starting points for the photographic runs. This ensured the inclusion in the sample of dwellings built between 1966 and 1971. The effectiveness of the sampling procedures is indicated by the fact that in two runs on the urban fringe dwellings were photographed while still under construction.

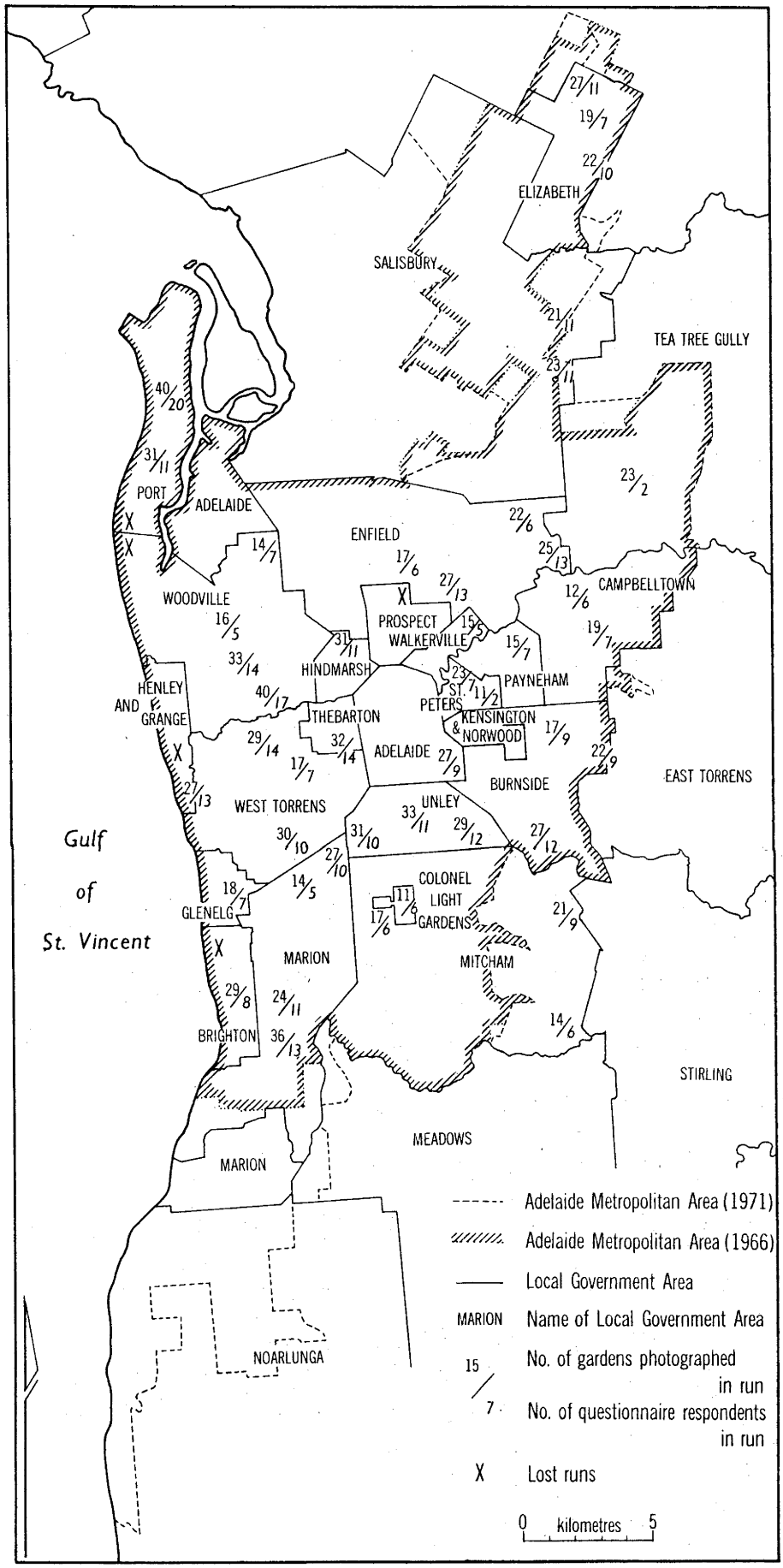


Figure 3.1 The Adelaide Metropolitan Area, showing the location of aerial photographic runs, the number of gardens photographed in each run, and the number of questionnaire respondents in each run.

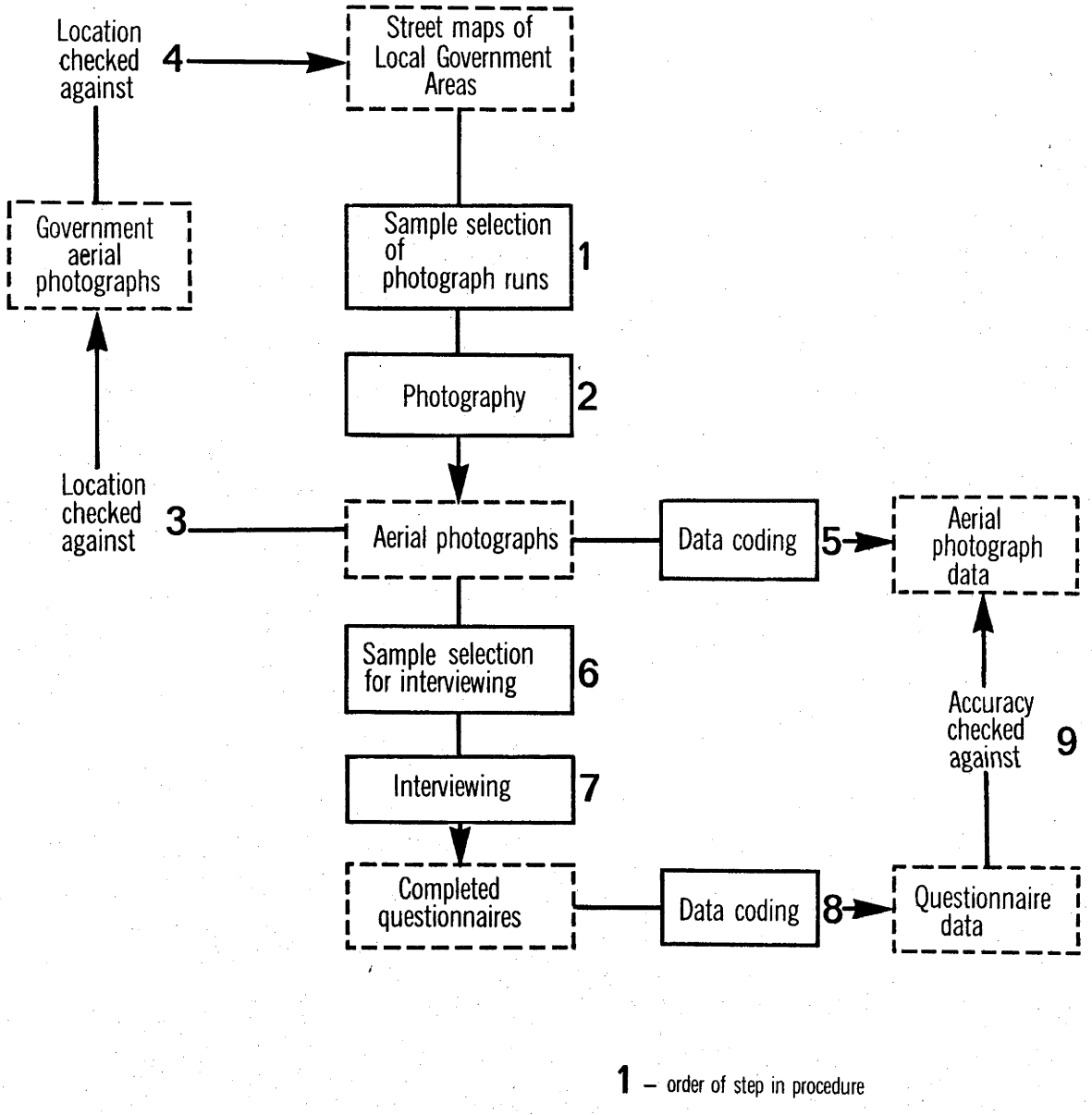


Figure 3.2 Flow chart of sampling, data collection, and accuracy checking system

TABLE 3.01

OCCUPATIONS OF THE HEADS OF THE SAMPLED HOUSEHOLDS AND OF THE POPULATION OF HOUSEHOLDS IN THE ADELAIDE STATISTICAL DIVISION

Occupation	Percentage of heads of sampled households (1973)	Percentage of heads of population of households (1971)
Professional	15	11
Administrative	17	11
Clerical	8	9
Sales	8	7
Farmers, etc.	1	2
Transport workers	8	7
Craftsmen, labourers	38	44
Service workers	4	5
Armed Services	1	1
Other and not stated	0	3
Total	100 N = 346	100 P = 188,127

Chi-square test of original data significant at the .001 level

Source: Questionnaire (Question 73) and Bureau of Census and Statistics (unpublished).

The Sample

The extent to which the questionnaire sample is representative of the population of Adelaide is indicated by Tables 3.01 to 3.04 which compare the occupations of the heads of the sampled household with those of the heads of the population of households in the Adelaide Statistical Division, the places of birth of the heads of the sampled households with the places of birth of the population of households, and the number of automobiles and persons at each of the sampled households with the

TABLE 3.02

PLACES OF BIRTH OF THE HEADS OF THE SAMPLED HOUSEHOLDS AND OF THE POPULATION OF HOUSEHOLDS IN THE ADELAIDE STATISTICAL DIVISION

Place of birth	Percentage of heads of sampled households (1973)	Percentage of heads of population of households (1971)
Australia	63	62
United Kingdom & Eire	15	19
Italy	7	5
Netherlands	3	1
Greece	3	2
Germany	3	2
Other	6	9
Total	100 N = 100	100 P = 233,157

Chi-square test of original data significant at the .01 level

Source: Questionnaire (Question 72) and Bureau of Census and Statistics. *1971 Census of Population and Housing*, Vol. 7.4:97.

equivalent data for the households described in the 1971 Census.

Two major factors account for the significant differences between the sample and Census distributions shown in the four tables. First, almost two years elapsed between June 1971 Census and the administration of the questionnaire in March 1973. This was a period of continuous economic growth and increase in the population and size of Adelaide. This partially accounts for the fact that the percentage of households in the sample with one or more motor vehicles is 6 per cent greater than in the population (Table 3.03). Second, the sample included only dwellings with private gardens, thus biasing the sample towards traditional

TABLE 3.03

NUMBERS OF MOTOR VEHICLES AT THE SAMPLED DWELLINGS AND AT THE POPULATION OF DWELLINGS IN THE ADELIADE STATISTICAL DIVISION

Number of Motor Vehicles	Percentage of sampled dwellings (1973)	Percentage of population of dwellings (1971)
None	13	18
One	56	52
Two or more	31	29
Not stated	0	1
Total	100 N = 430	100 P = 233,157

Chi-square test of original data significant at the .01 level

Source: Questionnaire (Question 70) and Bureau of Census and Statistics. *1971 Census of Population and Housing*, Vol. 7.4:99.

nuclear families. The effects of excluding from the sample households living in flats, hotels, and institutions are evident in Table 3.01 which shows that a relatively large percentage of heads of the sampled households were in the professional and administrative groups and a relatively small percentage in the craftsmen, labourers group and in Table 3.03 which shows that a relatively small percentage of the sampled households consisted of only one person. It is possible that the significant differences between the places of birth of the heads of the sampled households and the heads of the population of households results from ethnic differences in residential density preferences.

TABLE 3.04

SIZES OF THE SAMPLED HOUSEHOLDS AND OF THE POPULATION OF HOUSEHOLDS IN THE ADELAIDE STATISTICAL DIVISION

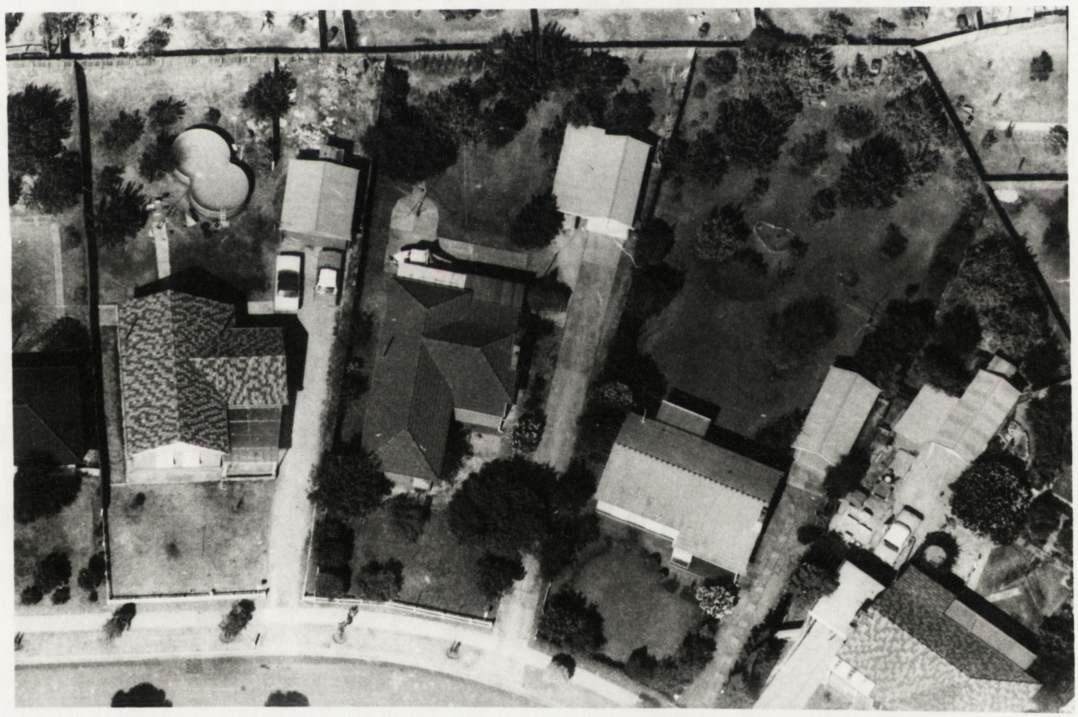
Size of household (persons)	Percentage of sampled households (1973)	Percentage of population of households (1971)
One	6	12
Two	26	26
Three	18	19
Four	28	20
Five	12	13
Six	5	6
Seven	2	2
Eight or more	1	2
Total	100 N = 430	100 P = 233,157

Chi-square test of original data significant at the .001 level

Source: Questionnaire (Question 16) and Bureau of Census and Statistics. *1971 Census of Population and Housing*, Vol. 7.4:99.

The Aerial Photographs

The photographs were taken from a Cessna 172 aircraft flying at 460 metres, using a hand-held 35 mm. through-the-lens-reflex camera equipped with a 200 mm. lens. The resulting high oblique photographs were printed for interpretation at an approximate scale of 1:800. By exposing frames at approximately three second intervals it was possible to obtain stereo coverage which greatly enhanced the usefulness of the photographs for object identification. A sample stereo pair of photographs is shown on Plates 3.1 and 3.2 and a map of a typical run, showing the relationship between the residential blocks on the ground and the photo



Plates 3.1 and 3.2. A stereo pair of photographs taken from a Cessna 172 aircraft flying at approximately 460 metres, using a hand-held 35 mm. through-the-lens reflex camera equipped with a 200 mm. lens. The photographs were exposed approximately three seconds apart, at a shutter speed of 1/1000 second, with an aperture of *f*/16, and on 400 ASA film.

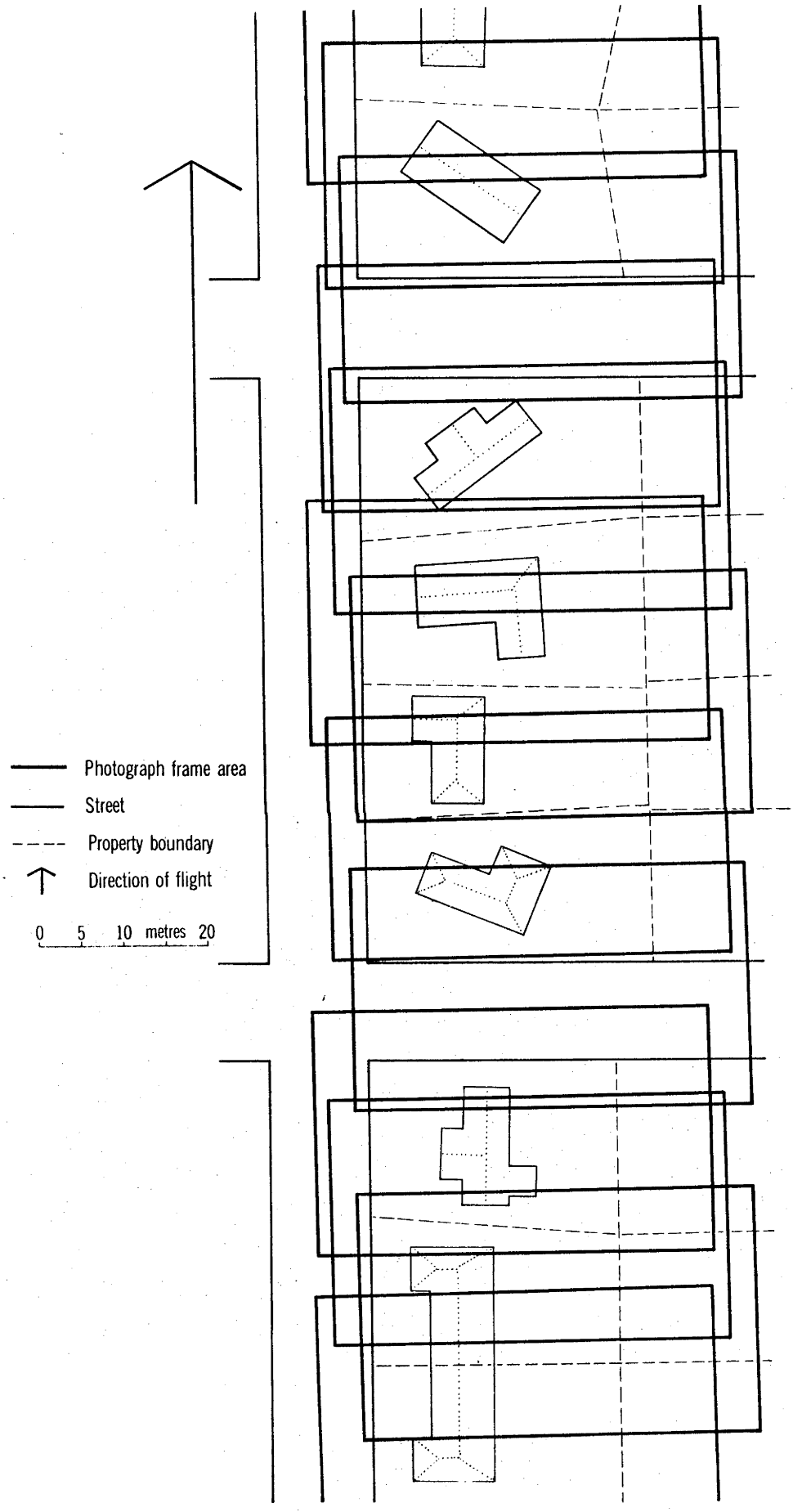


Figure 3.3 Portion of a typical aerial photographic run

frames, is shown on Figure 3.03. Table 3.05 is a list of the variables coded for each photographed block.

The length of runs was fixed by the amount of film in the camera, two runs to a roll of film, eighteen frames to a run. The number of dwellings photographed in a run varied according to the size of blocks in

TABLE 3.05

LIST OF ITEMS CODED FROM AERIAL PHOTOGRAPHS

Type of street - main road, through residential, or cul-de-sac
Size of block
Shape of block
Sizes of front, back and side gardens
Type of dwelling - terrace or row house, semi-detached house or detached house
Front, back and side boundary demarcations - type and height of demarcations
Demarcations within the block - type and apparent purpose
Garages - number and locations within the block
Outhouses - number and types
Parking areas - type and location within the block
Storage of material - type of material and location within the block
Pools - decorative and swimming
Children's play areas - type and location within the block
Adults' recreation areas - type and location within the block
Decorative constructions - pergolas, gnomes, etc.
Number of trees over 3 metres
Number of water storage tanks
Clothes drying facilities - type and location within the block
Principal surface materials (i.e. lawn, pavement, etc.) of front, back and sides
Flower gardens - type and location within the block
Vegetable gardens - size and location within the block
Quality of maintenance of front, back and sides - 5 point scale
Degree of elaborateness of design of front, back and sides - 5 point scale

the run, the existence of non-residential uses in the middle of the run, and the ability of the photographer and the pilot to keep the aircraft on the appropriate course for a complete run.[1] Forty-nine of the fifty nominated runs were made; two runs were lost as a result of camera malfunction, two as a result of a malfunction in processing, and one run was not made because Adelaide Air Traffic Control moved the aircraft out of the area and by the time it was practical to return the light had become unsatisfactory. Within the forty-five successfully completed runs are 1058 dwellings, an average of twenty-four per run; the runs range from eleven to forty dwellings. Of the 1058 gardens photographed eighteen are almost totally obscured by trees: these are included in the questionnaire sample but are excluded from analyses based on the aerial photographs.

This photographic technique was developed for the present study to allow a very high level of object identification. It is possible to identify objects in the photographs as small as 20 cm in length, a level of detail that cannot be obtained from commercial aerial photographs. The system has a number of disadvantages, however. A single engine aircract flying at low altitudes is not a particularly stable platform for photography and consistent coverage relies on the ability of the photographer to visually locate his 'target', constantly compensating for drift in the course of the aircraft and other irregularities in its flight. As a result the photographs are not taken at consistent angles and are they are not at a consistent scale; measurements of distances and areas from the photographs is not possible. Precise measurement is not essential to the present study, however, and the technique offered the advantages of very detailed coverage at very low cost.

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1. Keeping the aircraft on course was difficult because the pilot could not see the target area which was almost directly below the aircraft.

One of the problems that arose from the lack of precision in the photographic technique was the possibility that the photographic coverage of a particular run did not cover the row of houses nominated by the sample. This problem was overcome by checking the runs of photographs against the official aerial photographs of the area and checking both sets of photographs against the maps on which the photographic runs were originally nominated (see Figure 3.02).

The Questionnaire

The interview questionnaire inquired into four major topics: the use that the sampled households made of their gardens for various types of recreation, their gardening activities, the design of their gardens and their design preferences, and, for the purposes of comparison, the socio-economic and family structure characteristics of the sampled households.[1] The questionnaire was administered during a three week period in March 1973 by twenty-one experienced interviewers. The interviewing period was kept as short as possible because it was feared that changes in the season or even the weather could result in serious bias in responses to questions on garden use. The weather was consistently fine throughout the interviewing period.

Of the original sample of 529 households (50 per cent of the aerial photograph sample) 430 interviews were completed, 81 per cent of the sample. Five per cent of the sampled households could not be contacted despite a minimum of four calls by the interviewer, and 14 per cent refused the interview. The reasons for these refusals are given in Table 3.06. No substitutions of new households were made when an interview could not be completed.

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1. The questionnaire schedule and a copy of the instructions to interviewers are presented in the Appendix, pp. 202-223.

TABLE 3.06

SUMMARY OF INTERVIEW COMPLETIONS AND REASONS FOR NON-COMPLETIONS

Reason for non-completion	No. of respondents	Percentage of non-completions	Percentage of sample
No contact made with household	25	25.3	4.7
No reason given for refusal	29	29.3	5.5
Respondent "not interested"	14	14.1	2.6
Respondent "too busy"	11	11.1	2.1
Interview "invasion of privacy"	8	8.1	1.5
Respondent old or infirm	7	7.1	1.3
Respondent "could not see point of interview"	3	3.0	.6
Recent death in family	2	2.0	.4
Total non-completions	99	100	18.7
Interviews completed	430		81.3
Total	529		100

Source: Questionnaire.

In an effort to ensure that the sample was as representative as possible experienced interviewers speaking Italian, Greek and eastern European languages were engaged to conduct interviews of households where English was not spoken. Interviewers were instructed to interview any member of the selected households who could be contacted including older children if they appeared to be of a responsible age. Whenever possible interviewers involved two or more members of the household in the interview -- usually a husband and wife -- and responses recorded

TABLE 3.07

ANNUAL HOUSEHOLD INCOME BY RESPONDENT

Income ($)	Respondent (percentage)				
	Male head	Wife of head	Female head	Child	Several or other
Less than 4,000	30	16	52	12	23
4,000-7,999	41	50	22	53	37
Over 8,000	22	16	17	19	28
Unknown	7	18	9	16	12
Total	100 n = 134	100 n = 175	100 n = 46	100 n = 32	100 n = 43

Chi-square test of original data significant at the .001 level

Source: Questionnaire (Questions 76 and 17).

were those where there was consensus.

Evidence of significant respondent bias, where the distributions of answers to questions vary between categories of respondents, was found in the responses to questions on the annual household income (Table 3.07) and on the member(s) of the household who did most of the gardening (Table 3.08). Some of the differences are attributable to differences between types of household. For example, it would be expected that a relatively large percentage of households with female heads would have incomes of less than $4,000 and that relatively few female heads would report a male gardener. However respondent bias is apparent where other major differences between the distributions of responses are attributable to differences in perception or lack of knowledge of households' affairs. Such differences are apparent between

TABLE 3.08

MEMBER OR MEMBERS OF THE HOUSEHOLD DOING MOST OF THE GARDENING BY RESPONDENT

Person gardening	Respondent (percentage)				
	Male head	Wife of head	Female head	Child	Several or other
Adult male	63	45	24	41	40
Adult female	12	32	48	22	23
Two or more adults	19	15	6	15	21
Other	6	8	22	22	16
Total	100	100	100	100	100
	n = 134	n = 175	n = 46	n = 32	n = 43

Chi-square test of original data significant at the .001 level

Source: Questionnaire (Questions 42 and 17).

the responses of male heads of household and the wives of heads in both tables.

The only means of eliminating such respondent bias would have been to interview only one category of respondent. This possibility was considered but it was rejected because it was thought useful to have the means of investigating the possibility that differences exist between the responses of different categories of respondent. Had only one category of respondent been interviewed the direction of any bias would not have been known. No significant bias was found in the responses to any questions other than the two discussed. The use of these two variables in the analysis has been minimized as a result of the known bias.

As soon as possible after completion questionnaires were checked against the aerial photographs of the garden. A number of simple questions in the schedule about features in the garden provided a rapid check that the interview had been conducted at the correct dwelling and a preliminary indication of the reliability of the responses. In a few cases it was necessary to return questionnaires to interviewers for verification in the field that the interview had been conducted at the correct dwelling; in each case substantial changes had been made to the garden during the four month period between the exposure of the aerial photographs and the interview.

The correspondence between the aerial photographs and the responses to the questionnaire is good except on two items, vegetable gardens and outhouses. Table 3.09 compares the questionnaire reponses to the question on vegetable gardens with the photographic evidence and indicates a 29 per cent error with 25 per cent of all respondents claiming vegetable gardens not identified on the aerial photographs. This error stems largely from the fact that in many cases only a few vegetables were grown, perhaps along a fence, and these were interpreted in the aerial photographs as flowers or shrubs. Vegetable gardens were not recorded from aerial photographs unless there was a clear indication of vegetables, for example, rowed plots or stakes.

The large discrepancy between questionnaire responses on the number of outhouses and the data recorded from the aerial photographs, an error of 43 per cent, appears to be due to the wording of the questionnaire. The distributions of questionnaire responses and the evidence from the aerial photographs are shown in Table 3.10. The word "outhouses", which was meant to refer to all detached buildings except garages within the block, was apparently not given this meaning by

TABLE 3.09

QUESTIONNAIRE RESPONSES ON VEGETABLE GARDENS BY AERIAL PHOTOGRAPH EVIDENCE OF VEGETABLE GARDENS

Aerial photograph evidence	Questionnaire responses (percentage)	
	Have no vegetable garden	Have vegetable garden
Have no vegetable garden	93	56
Have vegetable garden	7	44
Total	100 n = 234	100 n = 187

Chi-square test of original data significant at the .001 level

Source: Questionnaire (Question 8.2) and aerial photographs.

TABLE 3.10

QUESTIONNAIRE RESPONSES ON NUMBER OF OUTHOUSES BY AERIAL PHOTOGRAPH EVIDENCE OF NUMBER OF OUTHOUSES

Aerial photograph evidence	Questionnaire response (percentage)		
	No outhouses	One outhouse	Two or more outhouses
No outhouses	62	21	17
One outhouse	24	49	17
Two or more outhouses	14	30	65
Total	100 n = 221	100 n = 177	100 n = 23

Chi-square test of original data significant at the .001 level

Source: Questionnaire (Question 8.11) and aerial photographs.

almost half of all respondents. This apparent error in wording occurred despite pre-testing of the schedule in five different forms, under a variety of field conditions, and by four interviewers. Failure to detect this problem in the questionnaire despite rigorous testing points up one of the greatest weaknesses in the questionnaire as a data collection method. The researcher cannot be certain that data are not lost or results biased by a small problem, perhaps a semantic one. The opportunity presented by the organization of this study to systematically verify the responses to some questions is a rare one.

Follow-up Interviews

In February 1974, eleven months after the first interview, a small sample of twenty-seven respondents were informally interviewed a second time.[1] The sample for this survey was randomly selected from among respondents to the first questionnaire who had indicated an intention to change their gardens during the following year. The primary purpose was to investigate whether the intended changes had been carried out. This second interview also tested the consistency of responses to five questions from the original questionnaire.

In the second interview 73 per cent of all responses by the twenty-seven respondents to the five repeated questions were the same as they had been in the first interview. Ten per cent of the answers changed because of changes in the structure or circumstances of the sampled households. The remaining 17 per cent of questions were answered differently on the two occasions for no apparent reason. The most consistently answered question was about which member of the household does most of the gardening, an interesting result in that significant

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1. The questions forming the basis of the follow-up interview are listed in the Appendix, p. 224.

differences were found in the way that this question was answered by different respondents to the first questionnaire (Table 3.08). The question most often answered differently concerned the amount of time spent cutting and trimming lawns. Half of the respondents to the second questionnaire gave different answers to this question from those given previously and in all but three of these cases the estimate of the amount of time spend on the lawn was reduced. This suggests that the apparent inconsistency might be a function of some common factor. The small size of the second sample precludes statistical testing of the differences, but the general level of consistency of the responses in the two interviews suggests confidence in the data.

The Analysis, Presentation, and Interpretation of the Data

The levels of measurement employed in the collection of the data were primarily nominal and ordinal, both levels of measurement which prohibit arithmetic operations and all parametric statistical tests (Seigel, 1956:22-26). The statistical tests employed in the analysis are limited, therefore, to two non-parametric techniques: a non-parametric correlation coefficient is used as a basis for a cluster analysis, the results of which are presented in Chapter 4, and the chi-square test is used extensively throughout the analysis to determine the significance of differences between categories of responses to questions in the questionnaire or classes of objects identified from the aerial photographs. These non-parametric techniques demonstrate associations between pairs or groups of variables but they do not statistically identify dependent variables or functional or existential relationships between variables. Where such relationships cannot be identified logically or on the basis of experience the interpretation of the data cannot be extended beyond

simple description.

In the cluster analysis groups of correlated variables were produced using the interval method of clustering in which items (variables) are added to a cluster on the basis of their average correlation with items already in the cluster. The clustering procedure is as follows: A matrix of correlation coefficients is examined for the highest correlation of a pair of items. Providing that this coefficient is equal to or greater than a predetermined minimum, .500 in the cluster analysis presented in Chapter 4, these two items form the basis of a cluster. The average correlation of these two items with all remaining items is then calculated and the item with the highest average added to the cluster subject to the constraint that the item must have a positive correlation at or above a predetermined minimum, in this case .200, with all items already in the cluster. This procedure is repeated until all items have entered the cluster, until no item has a positive correlation with all items already in the cluster, or until the average correlation falls below a predetermined minimum, in this case .200. All items entering a cluster are removed from the matrix and can enter no other cluster. If items remain after a cluster has been completed a new cluster is begun and clustering continues until all items have entered clusters or until no new cluster can be begun under the constraints described above. The clusters described in the present study are drawn from a correlation matrix of dichotomous variables using a variation of the non-parametric correlation coefficient phi (ϕ) which is scaled to yield a coefficient

of unity for complete association.[1,2]

The phi coefficient was designed for the correlation of naturally dichotomous variables classified on a nominal scale (Guilford, 1956:311). Many of the variables described in the cluster analysis in Chapter 4 can be interpreted in this way; for example a garden can be classed as having or not having a swimming pool without taking into consideration the various types of swimming pool. However other variables described in the analysis are measured on ordinal or interval scales and correlation with variables measured on a nominal scale has required artificial dichotomization of these variables. For example, the number of persons

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1. The generation of the matrix of PHI/PHIMAX coefficients and the cluster analysis were undertaken using the programs CORREL and CLUSTER, both part of the OSIRIS II package (*OS Users Manual*. Ann Arbor, Michigan: Inter-University Consortium for Political Research, Institute for Social Research, University of Michigan, 1972, pp. 287-296 and 401-408.)

2. The scaled coefficient ϕ, called PHI/PHIMAX, is calculated by the formula:

$$\text{PHI/PHIMAX} = \frac{AD - BC}{(B + D)(A + B)}$$

where A and B are the cells of the top row and C and D are the cells of the bottom row of a 2 x 2 contingency table and where AD > BC and C > D.

The significance of the PHI/PHIMAX coefficient can be determined where the significance of ϕ is equal to the significance of χ^2 and where

$$\phi = \text{PHI/PHIMAX} \frac{\sqrt{(B + D)(A + B)}}{\sqrt{(C + D)(A + C)}} , \qquad \chi^2 = N\phi^2$$

For a 2 x 2 contingency table (df = 1) χ^2 is calculated by the formula:

$$\chi^2 = \frac{N(|AD - BC| - \frac{N}{2})^2}{(A + B)(C + D)(A + C)(B + D)}$$

The values of PHI/PHIMAX presented with the clusters in Table 4.01 are arithmetic means, the significance test properties of which are not explained in the *OS Users Manual* or other literature reviewed. Consequently only the mean PHI/PHIMAX coefficients are presented in the table.

in the sampled households has been dichotomized to describe households as having "one or two persons" or "more than two persons", and the ages of heads of households are dichotomized as "60 years or more" or"59 years or less". The loss of information through the artificial dichotomization of variables and the necessity of assuming that artificially dichotomized variables can be treated as naturally dichotomous variables in calculating the phi coefficient discourages the use of cluster analysis for rigorous analyses of these data. It would not be appropriate, for example, to use clusters for the mapping of regional variations in any aspects of garden use or design in the manner of the "social area analysts". Nevertheless cluster analysis is a useful means of identifying associations between groups of variables and it is used in Chapter 4 as an introduction to the data.

In Chapters 5 to 7 the data are presented in tables which are either simple frequency distributions for single variables or percentage contingency tables for pairs of variables. Where appropriate the level of significance of the chi-square test is presented at the end of the table. This level of significance, presented in the form ".001", represents the probability that the study sample represents a random distribution. The chi-square test does not provide insight into the direction that deviations from randomness take. In a contingency table (the simplest form of cross-tabulation) a significance level of .001 indicates there is a very high probability the distribution of the first variable varies with the distribution of the second variable within the population from which the sample was drawn, but it indicates nothing about the nature of this relationship. This can only be inferred from the structure of the contingency table (Seigel, 1956:42-45, 104-111; and Lewis and Burke, 1971). The results of chi-square tests with levels of significance of .20 or lower have been rejected as not significant in

the present study.

The non-parametric levels of measurement employed in the study present a fundamental problem inherent to social science and behavioural studies of this *genre*: to what extent can the relationships observed in a plethora of non-parametric data be assumed to occur in the population from which the sample was drawn? The answer lies, of course, in the reliability of the sample: the sample must be a good representation of the population. This cannot be rigorously tested in a new field of inquiry where the data are non-parametric, and judgment must be intuitive, guided by three basic considerations. First, the sample data are compared with other data of known reliability. In the present study data which describe some of the characteristics of the sampled households are compared with Census data and it is possible to account for most of the differences between the two. Second, data are examined for unaccountable internal inconsistencies. Such inconsistencies do occur between the aerial photograph data and the questionnaire data, within the questionnaire data, and between the questionnaire data and the data collected through the small follow-up interview, but in most cases it is possible to account for the observed differences and where it is not possible variables are eliminated from the analysis. Third, the sample data must be judged on the basis of whether the observed phenomena conform with the expectations of informed observers, even in the absence of comprehensive and comparable empirical precedents: few of the data presented in this study will be regarded as extraordinary by observers familiar with the suburban environment of Adelaide.

In the second part of the study the data are presented as a set of observations about the sampled gardens and households. In the third part -- the discussion -- it is assumed that the data are representative

of the population and these observations form the bases of general conclusions about garden use and design in Adelaide. The temptation to take generalization a step further and apply the findings of this study to other Australian, North American, and European cities is inevitable. There are no systematic bases for such extensions of the findings, of course, and no assumptions have been made, nor hypotheses tests, concerning comparisons between gardens in Adelaide and gardens in other cities. When such comparisons are made several factors will have to be taken into consideration. Environmental differences -- differences in climate, topography, and soils -- must result in different patterns of garden use and design. Historical and cultural differences are associated with different residential forms and even where patterns of development have been similar cultural differences may be reflected in different patterns of use and design. Finally, it is possible that residents of different cities have different urban self-images. For example, Adelaide is sometimes called a "City of Gardens", and parts of Adelaide, especially the old city area originally planned by Colonel Light, are very well endowed with parks. It is possible that residents of the city are conscious of this garden image and that the level of maintenance of residential gardens in Adelaide is, as a consequence, higher than it is in other cities. The identification of physical, cultural, and social differences between cities and the effects of these differences on the use and design of residential gardens must await comparative studies.

PART II

THE DATA

CHAPTER 4

SOME DIMENSIONS OF GARDEN USE AND DESIGN: CLUSTER ANALYSIS

The results of a cluster analysis[1] are presented in this chapter as a means of introducing the data in a relatively unstructured form. Because simultaneous detailed contemplation of a great many facets of a phenomenon would be extremely difficult it is necessary, beginning in the initial conceptualization stages of a study, to impose some sort of structure on the phenomena under investigation, to categorize and systematize the multivariate data in some way. In the present study the structuring begins with a differentiation between garden design and garden use. In considering garden design a distinction is made between the arrangement of the elements of design in gardens and the quality of maintenance of gardens. Garden use is divided into three basic categories -- gardening, recreation, and household ancillary activities -- and each of these three categories is in turn divided into a number of individual activities.

The selection and specification of measured variables is strongly influenced by the initial structural "overview". Thus the structure imposed at the initial conceptualization will influence conclusions and possibly particular interpretations of the data. There is also the possibility that the structure employed in a pioneering study such as this could persist beyond the present study by influencing or biasing the thinking of other researchers. It is impossible to eliminate bias originating from variable selection and specification, of course, but tendencies for interpretation of the data to be biased by initial compartmentalization of the inquiry can be overcome by applying an

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1. The CLUSTER program is described in Chapter 3, pp. 60-62.

overall grouping technique to the whole data set. This is the purpose of the cluster analysis. The cluster analysis must make use of the same data as the detailed analyses in the following chapters, of course, but it goes beyond the simple analyses of independent variables or cross-tabulated pairs of variables by producing inter-correlated groups of variables.

Cluster Analysis

Ten clusters of three or more variables are presented in Table 4.01.[1] The table gives the mean coefficient of PHI/PHIMAX for each cluster, the class of each variable, and the dichotomization of each variable as it entered the cluster. The class of variables indicates whether they describe the structure and circumstances of the households, the dwellings, the use of gardens for particular activity types, or the design of gardens.

Cluster 1. The use of gardens for two types of recreation and aspects of garden design are associated in the first cluster with the size and structure of households and the sizes of dwellings. The five variables describing households and the one indicating the sizes of dwellings are self-explanitory. "Active recreation" refers to the use of gardens for playing games or sport or working on hobbies other than gardening. "Social recreation" includes eating, barbequing, and entertaining friends. "Use the back garden for recreation" refers to all forms of recreation: active and social as well as a third type, "passive recreation", which includes reading, sunbathing, and sleeping. "Use the back garden for

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1. Of 71 variables included in the correlation matrix 50 entered clusters Six of the remaining variables describe gardening activities, 6 the design of gardens, 5 the use of gardens for recreation, 2 the characteristics of households, and 1 each the characteristics of dwellings and the use of gardens for household ancillary purposes.

TABLE 4.01

THE RESULTS OF A CLUSTER ANALYSIS OF GARDEN USE, GARDEN DESIGN, AND HOUSEHOLD CHARACTERISTICS

Class of variable	Description of variable	Dichotomization of variable
Cluster 1		
Household	Children 5 years or less	no/yes
	Children 6 to 10 years	no/yes
	Size of household	2 or less/more than 2
	Age of head of household	60 years or more/59 years or less
	Employment of head of household	not employed/employed
Dwelling	Number of bedrooms	2 or fewer/more than 2
Recreation	Active	no/yes
	Social	no/yes
	Use back garden for recreation	no/yes
Garden design	Children's play area	no/yes
	Preferred block size	small/large
	(Mean coefficient of phi = .560)	
Cluster 2		
Location of dwelling	Distance from C.B.D.	3 miles or less/more than 3 miles
Dwelling	Age of dwelling	11 years or more/10 years or less
Garden design	Swimming pool	no/yes
	Front fence	yes/no
	Size of front garden	small/large
	(Mean coefficient of phi = .576)	

Cont'd....

TABLE 4.01 Continued

Class of variable	Description of variable	Dichotomization of variable
Cluster 3		
Household	Nature of occupancy	renting/owned or buying
Garden design	Size of block	small/large
	Size of back garden	small/large
	Elaborateness of back garden	plain/elaborate
	Garden decorations	no/yes
	Garage	no/yes
	(Mean coefficient of phi = .485)	
Cluster 4		
Garden design	Decorative vegetation in front garden	no/yes
	Decorative vegetation in back garden	no/yes
	Elaborateness of front garden	plain/elaborate
	Trees over 3 metres	no/yes
	Fruit trees	no/yes
	(Mean coefficient of phi = .425)	
Cluster 5		
Recreation	Proportion of children's rec. time spent outdoors	less than half/half or more than half
	Proportion of adult's rec. time spent outdoors	less than half/half or more than half
	Use gardens for hobbies	no/yes
Gardening	Time spent on lawns	1 hour per week or /more than 1 hour less
	(Mean coefficient of phi = .404)	

Cont'd....

TABLE 4.01 Continued

Class of variable	Description of variable	Dichotomization of variable
Cluster 6		
Garden design	Quality of maintenance of front garden	poor/good
	Quality of maintenance of back garden	poor/good
	Cultivation of flowers	no/yes
	Adults' recreation area	no/yes
Gardening	Frequency of gardening	fortnightly or less frequently/weekly or more frequently
	(Mean coefficient of phi = .442)	
Cluster 7		
Recreation	Passive	no/yes
	Use front garden for recreation	no/yes
	Use neighbourhood for recreation	no/yes
	Use beach for recreation	no/yes
	(Mean coefficient of phi = .383)	
Cluster 8		
Gardening	Use paid labour	no/yes
Garden design	Prefer to have a front fence	no/yes
Household ancillary use of garden	Use garden for vehicle maintenance	yes/no
	(Mean coefficient of phi = .380)	

Cont'd....

TABLE 4.01 Continued

Class of variable	Description of variable	Dichotomization of variable
Cluster 9		
Household	Children over 15 years	no/yes
	Income of household	$4000 or less/more than $4000
	Number in employment	none or 1/2 or more
Recreation	Proportion of children's outdoor rec. time spent in garden	half or more/less than half
	(Mean coefficient of phi = .408)	
Cluster 10		
Household	Children 11 to 15 years	no/yes
Recreation	Use local park for recreation	no/yes
Household ancillary use of garden	Keep animals	no/yes
	(Mean coefficient of phi = .362)	

Source: Questionnaire and aerial photographs.

recreation" is somewhat redundant in this cluster where it is correlated with active and social recreation, however it does differentiate the use of the back garden from the use of the front garden and from the use of other venues outside the home. Some of these other venues, which include the neighbourhood (neighbours' gardens and the street), local parks, the beach, rural parks, and private clubs, appear in subsequent clusters. Children's play facilities include swing sets, sand-boxes and cubby houses. The "large" category of preferred block sizes includes all block sizes larger than that normally associated with semi-detached dwellings in Adelaide; "small" includes the semi-detached size and all smaller blocks including self-contained flats which have no garden.

Large households, especially households with young children, households with working heads, and households with heads aged 59 years or less are positively correlated in the cluster with the use of gardens for active and social recreation and with the existence of children's play areas in their gardens. Members of these large and active households generally expressed preferences for large gardens.

Cluster 2. Most of the variables in this cluster require no explanation. The sizes of front gardens and back gardens (a variable which appears in Cluster 3) were dichotomized on the same basis as the sizes of blocks; "small" front and back gardens are generally associated with semi-detached and smaller blocks, "large" with standard-sized or larger blocks. "Small" front or back gardens may occur on standard-sized blocks, however, if dwellings are large or unusually sited.

The cluster describes differences in the designs of gardens that occur with differences in the ages and locations of dwellings. Generally dwellings of recent construction are located in outer suburbs and these dwellings tend to have standard-sized ("large") front gardens and no

front fence. Older dwellings in the inner suburbs, many of them built before the introduction of rigid set-back regulations, have smaller front gardens and some form of front fence or wall. Swimming pools are associated with "large" blocks.

Cluster 3. This cluster identifies two relationships examined in detail in Chapter 7: the effects of nature of occupancy and the size of the block on the design of residential gardens. Block sizes are defined in the same way as preferred block sizes, a variable which appeared in Cluster 1. The elaborateness of back gardens and of front gardens (Cluster 4) refers generally to the number and extent of design elements in gardens. A "plain" front garden consists of only the almost ubiquitious lawn, a foot-path to the front door, and perhaps two or three shrubs or a narrow flower border along the foot-path. Similarly, a "plain" back garden consists of a lawn, a garage, a clothes hoist, and perhaps small plantings of vegetables, shrubs, or flowers that occupy less than 10 per cent of the area of the garden. "Elaborate" front and back gardens contain a number of different design elements or extensive areas of individual elements of design; more than 10 per cent of the area of "elaborate" venues is occupied by design elements other than ground cover. This system of dichotomization is used to formulate a classification of garden design types in Chapter 5.

Garden decorations are fabricated elements of design including all concrete or wooden constructions such as pergolas and gnomes or other gnome-like decorations. There is considerable redundancy, of course, between the variables "elaborateness of back garden" and "elaborateness of front garden" and variables such as "garden decorations" and "decorative vegetation" which describe particular elements of design. However the "elaborateness" variables describe the number of elements in a venue and the other variables describe only whether individual elements or

particular types of elements occur. An elaborate venue could, and in a few cases did, consist entirely of fabricated elements of design.

Gardens in small blocks and gardens associated with rented dwellings are often plain, lacking fabricated decorations and even garages in many cases. Many dwellings on "small" blocks, such as the Housing Trust semi-detached dwellings, are rented.

Cluster 4. The vegetation in gardens can be categorized into six principal types, four of which are represented in this cluster: grass, a ground cover; flowers and vegetables, both of which are often annual horticultural crops; shrubs, "permanent" decorative plants less than three metres in height; trees over three metres in height; and fruit trees which are productive as well as decorative and shade producing. In this cluster flowers and shrubs are jointly described as "decorative vegetation" while in Cluster 6 the cultivation of flowers appears as a separate variable.

Front and back gardens are often similar in design and, as shown by Cluster 6, in quality of maintenance. Where decorative vegetation has been cultivated in the front garden it is often found in the back. Similarly, decorative or shade trees are often associated with fruit trees.

Cluster 5. This cluster shows relationships between the recreation behaviour of different members of households and between general recreation behaviour and the use of gardens for diverse activity types. The proportion of their recreation time spent outdoors but not necessarily in the garden by adults is positively correlated with the proportion of children's recreation time spent outdoors and both of these variables are positively correlated with the use of the garden for hobbies other

than gardening and with the amount of time spent caring for lawns. The correlation of three recreation variables in this cluster is similar to the correlation of three recreation variables in Cluster 1 and four in Cluster 7, indicating that outdoor recreation is seldom limited to single activity types or to particular venues.

Cluster 6. Like the "elaborateness" variables in Cluster 3 and 4, the "quality of maintenance" variables are subjective. A garden with poor maintenance did not have its lawns cut or watered, was over-grown with weeds, or was filled with garbage. A garden with good maintenance was one which had obviously been tended with some care. Adult's recreation areas are permanent recreation facilities such as decks, patios, or garden furniture.

The qualities of maintenance of front and back garden are correlated in this cluster with the frequency of gardening; weekly or more frequent gardening is associated with good maintenance in both venues. The correlation of the cultivation of flowers with these three variables indicates that frequent gardening is seldom limited to the good maintenance of entirely plain gardens. The inclusion of adults' recreation areas in this cluster suggests that the use of gardens is seldom restricted to a single activity type and that the design of gardens often includes fabricated elements in association with vegetative elements.

Cluster 7. In this cluster the use of the garden for passive recreation and the use of the front garden, the neighbourhood, and the beach for recreation are all correlated. There is apparent association of adults' passive recreation with children's active recreation; all three of the venues grouped in this cluster are used for passive recreation but they

are also used for active recreation, especially by children.

Cluster 8. This cluster and Cluster 9 indicate differences in the ways various socio-economic groups use their gardens. There is a negative correlation in Cluster 8 between the use of paid labour for the maintenance of gardens and the use of gardens for the care and maintenance of vehicles. Many households that choose, and can afford, to have all or part of their gardening done for them also choose to have their vehicles washed and repaired commercially. If it is assumed that the ability to pay for professional garden and vehicle maintenance generally indicates membership in an upper socio-economic group the correlation of a preference for front fences or walls, as opposed to open front gardens, with the use of professional maintenance services suggests that the members of this upper socio-economic group seek more privacy or a different kind of privacy than do members of other groups.

Cluster 9. This cluster contains an expected correlation of the household's total annual income[1] with the number of members of households in employment, and the presence in the household of children over 15 years of age. Household incomes of over $4,000 are associated with two or more members of the household in employment and with children over 15 years of age. The negative correlation in the cluster of children spending half or more than half of their outdoor recreation time in the garden with children over 15 years suggests that younger children use the garden more than older children. This correlation also indicates

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1. The variable "total annual household income" is not used in the detailed analysis because the data on 13 per cent of the households are missing and because evidence of significant respondent bias was found in the data. (See Table 3.07, p. 54.) However the variable was included in the cluster analysis (dichotomized as $4,000 or less/more than $4,000) with cases where data were missing excluded from the calculation of the correlation coefficients.

that children in households with lower incomes use the garden for recreation more than those in upper socio-economic status households.

Cluster 10. In this cluster children in the 11 to 15 year age group are correlated with the use of the local park for recreation and with the keeping of domestic animals. Considered in conjunction with Clusters 1 and 9 this correlation suggests that the use of the garden by children changes and decreases as children become older. In Cluster 1 the presence of children 10 years of age and under is correlated with the use of the back garden for recreation, the use of the garden for active recreation, and with children's play areas. In Cluster 10 children between 11 and 15 years are correlated with the keeping of animals in gardens but children in this age group appear to move beyond the limits of the garden to use local parks for recreation. By the time children reach 15 years of age, Cluster 9 indicates, the garden has diminished in importance as a venue for their recreation activity.

Despite the weaknesses inherent in the technique and the degree of generalization resulting from the necessity of dichotomizing the variables the cluster analysis overcomes some of the limitations imposed by the disaggregation of the data by producing heterogeneous groups of variables. Only two of the ten clusters, Clusters 4 and 7, contained variables of only one class. In the remaining eight clusters variables describing the characteristics of households are correlated with variables describing garden design, recreation activities, and the use of gardens for household ancillary purposes, variables describing garden design are correlated with variables describing recreation activities, gardening, and household ancillary uses, recreation variables are correlated with gardening and household ancillary variables, and gardening variables with household ancillary uses. The value of the cluster analysis lies as much in the

demonstration that relationships exist between diverse classes of variables as in the descriptions of specific relationships between individual variables, many of which are described in much greater detail in the chapters that follow. However the specific relationships identified by the cluster analysis do, collectively, provide a useful general summary of garden use and design.

CHAPTER 5

THE DESIGN AND MAINTENANCE OF RESIDENTIAL GARDENS

"Before We Were Here There Was Nothing"

With a sweeping gesture taking in all 550 square metres of a brand-new garden a young home owner on the northern fringe of Adelaide explained that when he had occupied his new house eight months before the interview the garden had been nothing but abandoned farmland. Now the front garden contained a lawn, a symmetrical arrangement of native saplings, and a colourful row of annuals. The back garden contained the beginnings of a lawn, a pre-fabricated tool shed, a clothes hoist, and a few rows of vegetables. While the gesture and the phrase revealed something of the gardener's perception of the natural and agrarian landscapes they also spoke of the effort, the expense, and the pride of accomplishment that characterized one householder's garden experiences -- personal and human aspects of garden design that are disguised and diminished when garden use and design are reduced to columns of percentages.

A variety of factors might have motivated the investment of a great deal of time, effort, and money in that garden: the desire to create something beautiful, the need to create a suitable venue for recreation, the need to conform with neighbours or perhaps set a standard for the neighbourhood, or a desire to increase property values by improving the appearance of the property. Whatever the motivation, pride in the result was obvious, an emotional satisfaction at being able to demonstrate to a stranger success at turning a tiny featureless plain into an acceptable garden. Although it does not appear in the columns of percentages this emotional aspect of garden conception and creation is critical. Without motivation to create and maintain gardens the familiar

suburban form of development could not exist. Were they not underlain by individual motiviations and personal pride the pragmatic aspects of gardening and garden design described in the following pages would have little meaning: it is this intensely personal aspect of residential gardens that distinguishes them from other elements of the urban land system.

Garden Design

An Inventory of the Elements of Garden Design

An inventory of the fabricated and vegetative elements of garden design is presented in Table 5.07. Some elements of design were virtually universal in the sampled gardens, for example corrugated iron or paling fences around back gardens and areas of lawn. Other elements, such as garages and flower gardens or shrubs, occurred in a large majority of gardens. Similarly, a large proportion of gardens had at least one tree over three metres in height. Other elements of design, being relatively rare, tended to distinguish gardens: these included large areas of pavement in front gardens, swimming pools, extensive collections of small fabricated decorations, and large numbers of trees. Table 5.01 disguises, through broad classifications, the immense variety of types of individual garden elements. The table does not document the speciation of trees, for example, nor does it describe the great variety of flower garden and shrub layouts that occurred in the sampled gardens. These details are obviously important to the design of individual gardens: the arrangement and speciation of the vegetative elements of design are critical to the appearance of gardens. Description of garden design at this level of detail requires painstaking biogeographic analysis such as that undertaken by Kimber (1966 and 1973) and Simoons(1965). The demarcation of property boundaries is the single element of design

TABLE 5.01

AN INVENTORY OF GARDEN DESIGN ELEMENTS

Design elements	No. of gardens*	Percentage of sample
Vehicle accommodation		
None	215	21
Car-port (not enclosed)	111	11
One vehicle enclosed	533	51
Two vehicles enclosed	67	6
Two or more vehicle enclosures	114	11
Total	1040	100
Out-buildings		
None	469	45
One	384	37
Two	119	11
Three or more	68	7
Total	1040	100
Material stored in open		
None	681	65
Building materials, car parts, "junk"	271	26
Caravan	31	3
Boat	18	2
Other (including several types of material)	39	4
Total	1040	100

Cont'd....

TABLE 5.01 Continued

Design elements	No. of gardens*	Percentage of sample
Front boundary demarcation		
None	235	23
Low (approx. 1 m.) rail or wire fence	452	43
Low wall	249	24
Other	104	10
Total	1040	100
Back boundary demarcation		
Iron or wood paling fence	971	93
Other	69	7
Total	1040	100
Walls or fences within garden - purpose		
None	379	37
Separate front from back	416	40
Other	56	5
Two or more walls and/or fences (usually separate front from back and other)	189	18
Total	1040	100
Decorative constructions		
None	807	77
Small decorations (gnomes, figures)	111	11
Trellis or arbor	106	10
Other	18	2
Total	1040	100

Cont'd....

TABLE 5.01 Continued

Design elements	No. of gardens*	Percentage of sample
Children's play facilities		
None	930	89
Swing set	95	9
Other	15	2
Total	1040	100
Adults' recreation facilities		
None	891	86
Patio or deck	84	8
Barbeque area	37	3
Other	28	3
Total	1040	100
Pools		
None	968	93
Decorative	11	1
Wading	41	4
Swimming	20	2
Total	1040	100
Front garden - type of surface		
Grass	932	90
Other (includes gravel, pavement, and bare earth)	23	2
Grass with 1/3 or more other	54	5
No front garden (terrace-type houses)	31	3
Total	1040	100

Cont'd....

TABLE 5.01 Continued

Design elements	No. of gardens*	Percentage of sample
Back garden - type of surface		
Grass	792	76
Other (as above)	50	5
Grass with 1/3 or more other	198	19
Total	1040	100
Number of trees over 3 m.		
None	158	15
One	125	12
Two	111	11
Three	127	12
Four	103	10
Five	104	10
Six	66	6
Seven	58	6
Eight	49	5
Nine	34	3
Ten or more	105	10
Total	1040	100
Front garden - decorative vegetation		
None	226	22
Flower or shrub borders	307	29
Flower beds (and shrubs)	126	12
Shrubs only	381	37
Total	1040	100

Cont'd....

TABLE 5.01 Continued

Design elements	No. of gardens*	Percentage of sample
Back garden - decorative vegetation		
None	332	32
Flower or shrub borders	150	14
Flower beds (and shrubs)	106	10
Shrubs only	452	44
Total	1040	100
Vegetable gardens**		
None	815	78
Small (less than 1/4 back garden)	176	17
Extensive (more than 1/4 back garden)	49	5
Total	1040	100

* excluding tree obscured gardens.

** these data are included despite the difficulty encountered in identifying vegetable gardens in the aerial photographs. See Table 3.09, p. 57.

Source: Aerial photographs.

described in detail in the present study.[1]

A Classification of Garden Design Types

The classification of design types is based on the dichotomization of garden elaborateness used in the cluster analysis.[2] The dichotomization

1. Tables 7.14 to 7.17, pp. 142-145.

2. Chapter 4, Table 4.01, p. 68 and p. 73.

of the design of front and back gardens results in four classes or types of garden into which all but a few of the gardens in the sample can be placed.[1] The distributions of the classifications of the gardens in the aerial photograph sample and the questionnaire sub-sample are shown in Table 5.02. The four design types are illustrated in Figures 5.01 to 5.04; these plans are representative examples of the design types, not models: under this system of classification elaborate venues could contain a variety of design elements, for example a back garden more than 10 per cent occupied by vegetable gardens, a back garden containing two or more outbuildings (other than a garage), and a back garden taken up with classical or formal arrangements of flower beds and hedges would all be classified as elaborate.

This simple system of classification was formulated to avoid two intractable difficulties that plague attempts to develop more elaborate systems. First, it is difficult to generalize garden design in a system of classification without implying a greater level of detail than is inherent in the system. The inclusion in a classification system of specific elements of design either assigns to those elements a particular significance or necessitates the inclusion of other elements. Any system that is based on a large number of individual elements quickly becomes incomprehensible and does little more than reflect the uniqueness

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1. Gardens obscured by trees are excluded from analyses based on the aerial photograph data. Ninety-six per cent of the non-tree obscured gardens were classified. Of the remaining 4 per cent (48 gardens) approximately half (22 gardens) belonged to terrace houses and classification was inappropriate because these dwellings have no front garden. Ten gardens could not be classified because either the front or the back garden had been lost to construction, usually of some type of business premises. The remaining 16 gardens were entirely given over to storage. In this context "storage" is essentially a euphemism for "junk"; many of the gardens in question contained wrecked automobiles and various other types of material that would be considered, by many, waste.

TABLE 5.02

THE DISTRIBUTION OF GARDEN DESIGN TYPES IN THE AERIAL PHOTOGRAPH AND QUESTIONNAIRE SAMPLES

Garden design type	Percentage of aerial photograph sample	Percentage of questionnaire sample
Plain throughout	35	36
Elaborate throughout	31	27
Plain front/elaborate back	25	28
Elaborate front/plain back	9	9
Total	100 N = 1010	100 n = 405

Source: Aerial photographs (with unclassified gardens excluded).

of gardens. If the number of classes is not to become unwieldy and if individual gardens are not to be excluded from the system because they do not contain particular elements, any classification system must be based on criteria which all gardens have in common. The second difficulty lies in the danger of basing a classification system on some element of taste, either the personal taste of the researcher or some elitist or popular design standard. The danger lies in the possibility of personal or elitist tastes generating aesthetic criticisms such as the condemnation of suburbs as monotonous. An example of the superimposition of elitist tastes on those of the individual gardener is found in Riesman's (1958:392) comment, in a discussion of American suburbs, that "it is striking how few of the gardens examined showed much sense for overall plan in time and space; items were often unrelated to each other by any visual aesthetic we could reconstruct". Any system of classification based on such subjective values tends to assume

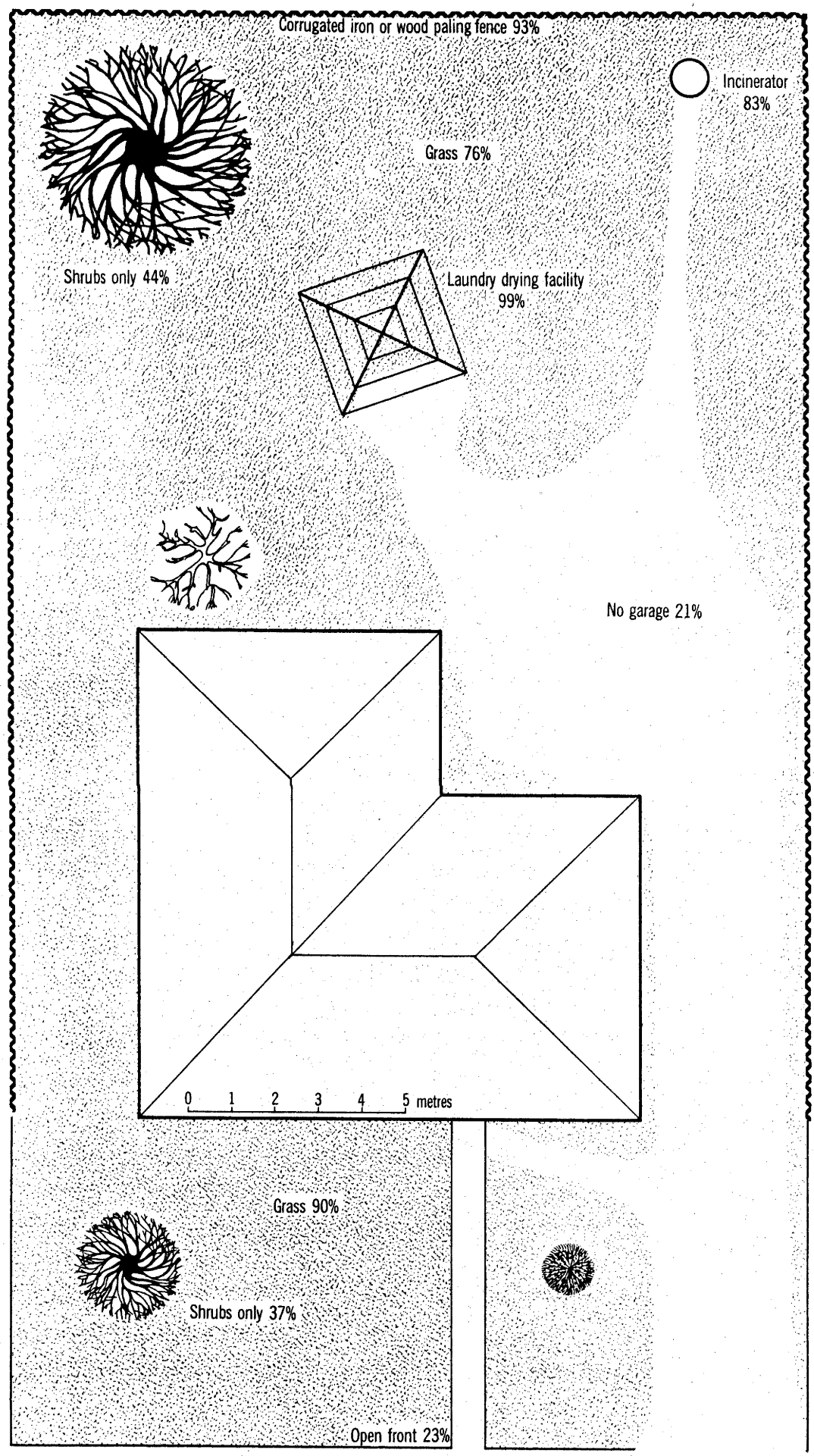

Figure 5.1 Plan of a plain garden showing percentage of sampled gardens with each design element (n=1040)

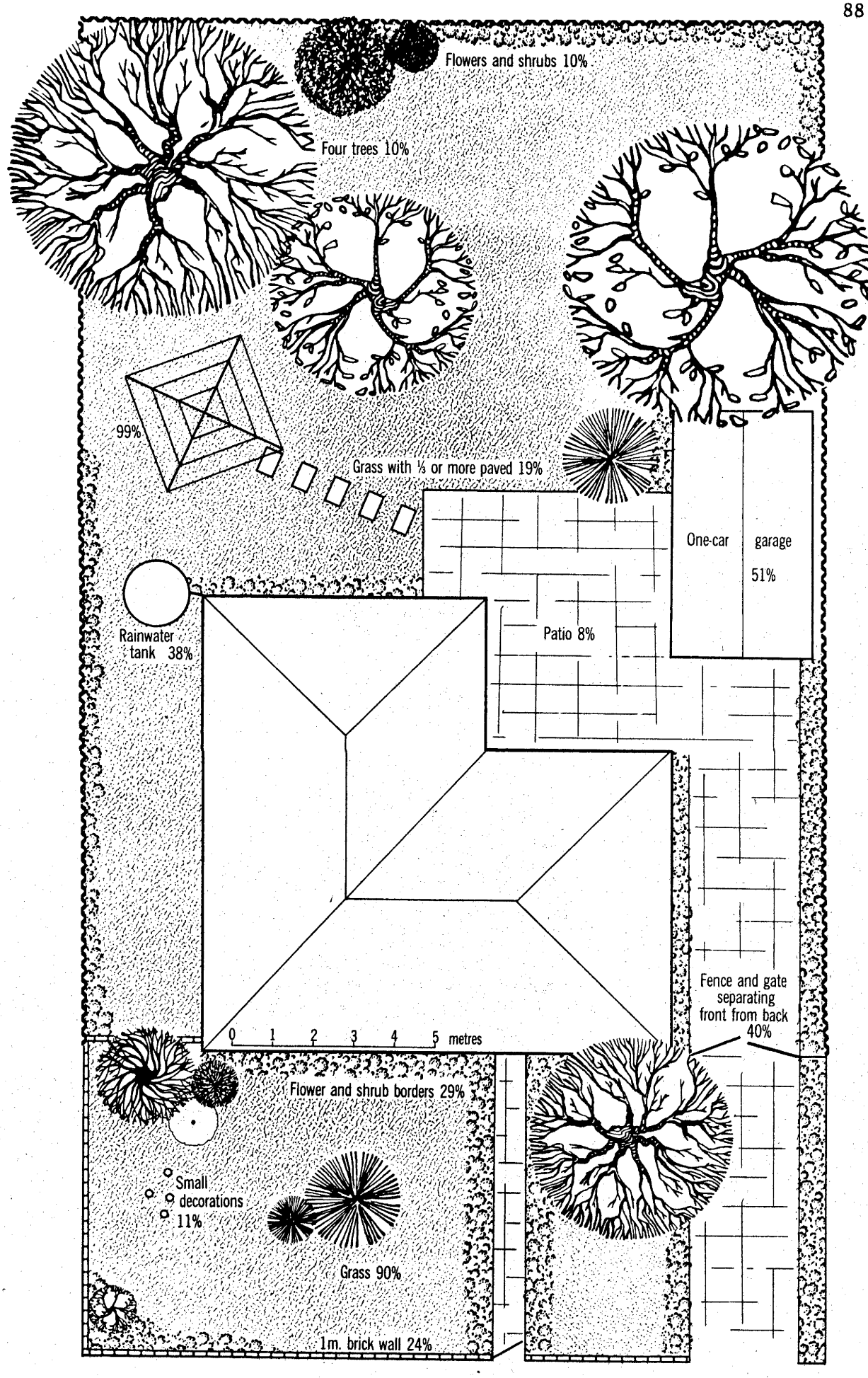

Figure 5.2 Plan of an elaborate garden showing percentage of sampled gardens with each design element (n=1040)

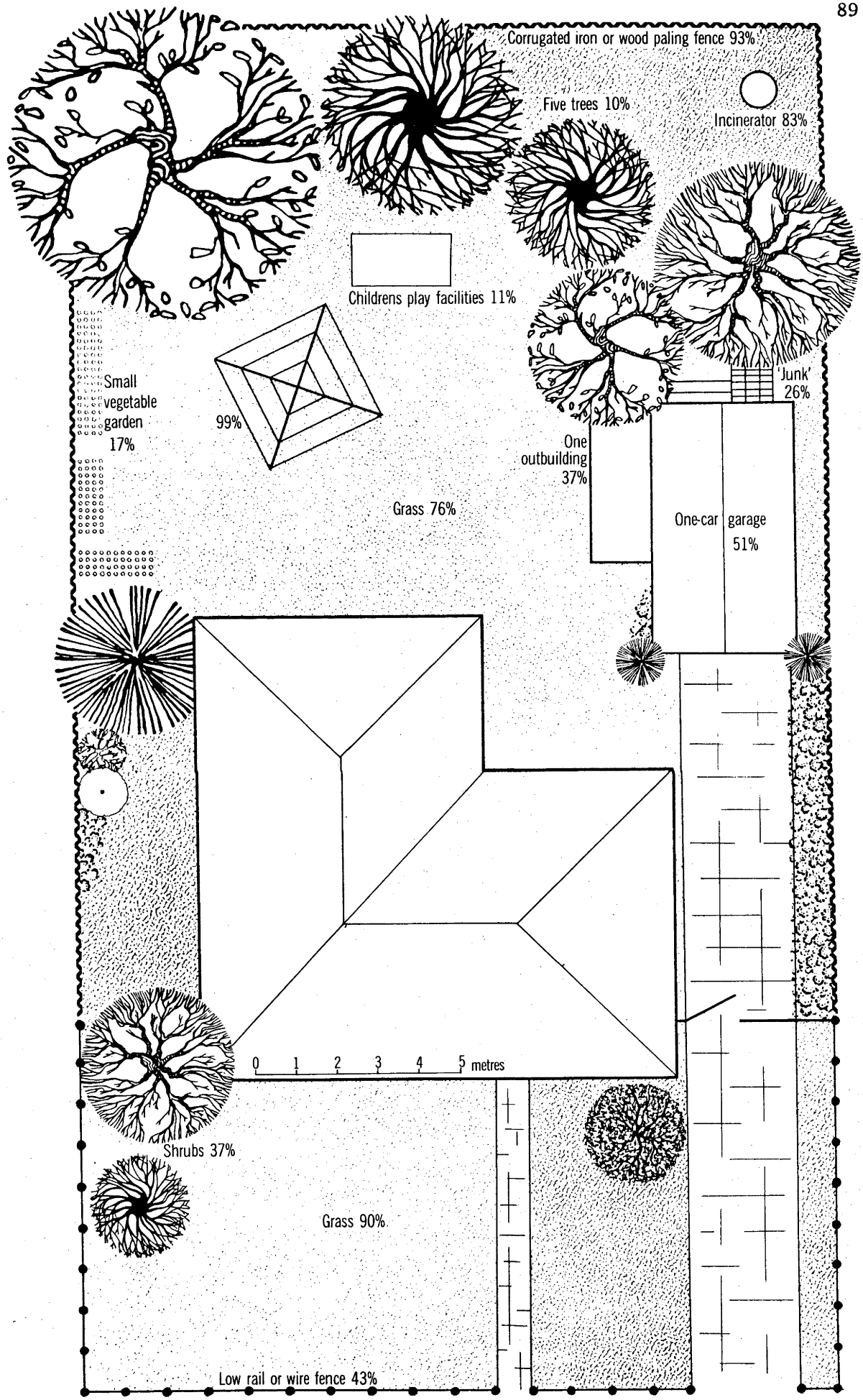

Figure 5.3 Plan of a garden with a plain front and elaborate back showing percentage of sampled gardens with each design element (n=1040)

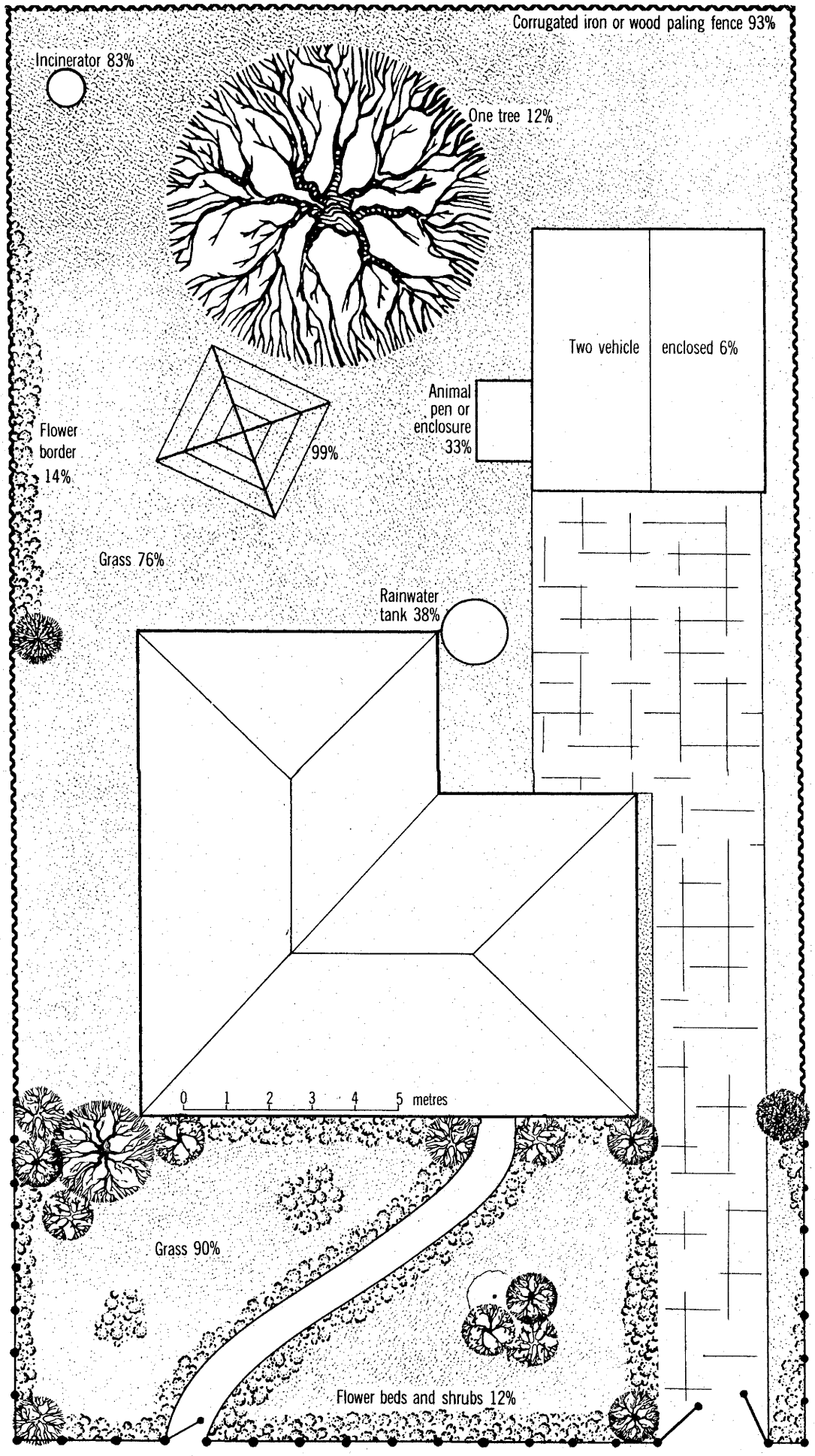

Figure 5.4 Plan of a garden with an elaborate front and plain back showing percentage of sampled gardens with each design element (n = 1040)

individual gardeners are attempting to achieve popular or elitist standards and the classification of gardens becomes merely a judgement of the gardeners' success. For the same reasons the quality of maintenance cannot be used as a criterion of classification.

Gardening: The Design and Maintenance of Residential Gardens

"Gardening" is a generic term for the hundreds of tasks associated with the maintenance of gardens, the modification of existing gardens, and the landscaping and development of new gardens. Gardening is important for two reasons. First, through gardening individuals translate their tastes into garden designs. Through their control over a small part of the suburban landscape gardeners influence the aesthetic judgements and even the tastes of others. At the same time, gardeners create and maintain environments which satisfy the practical needs of their households for venues for various types of activities, their aesthetic needs, and, perhaps, their needs visibly to conform to community standards. Second, gardening absorbs a great deal of suburban dwellers' time and energy. Compared to other types of chores and recreation activities gardening is unusual in providing an opportunity to indulge in a wide variety of non-competitive physical activities with potentially satisfying and enduring results. This discussion of gardening describes involvement in gardening in terms of the amount of time spent at gardening activities, the quality of maintenance of gardens, the cultivation of flowers and vegetables, the propensity of many gardeners to alter their gardens, and attitudes towards gardening.

The Allocation of Time to Gardening Activities

The allocation of time to gardening activities is considered in

terms of the frequency at which members of the sampled households[1,2] undertook gardening tasks (Table 5.03) and the number of hours spent each week at three basic types of gardening activity (Table 5.04) during the season defined by the respondent in each household as the time of the year when most of the gardening was done (Table 5.05). Gardening was undertaken mainly at weekends by 45 per cent of the sampled households (196 households), throughout the week by 41 per cent (175 households), and mainly on weekdays by 12 per cent (51 households). The average time spent at the three types of gardening activity were: 1.8 hours per week cutting and trimming lawns, 4 hours watering by hand, and 3.9 hours per week at other tasks such as caring for flowers and vegetables. Totalled, these averages equal 9.7 hours per week, 5.7 of which were spent at potentially strenuous tasks (excluding watering).

The data on the amount of time spent gardening appear to correspond with data collected by Ward (1970:15), who, in his Adelaide study, found that 13 per cent of his respondents spent "nearly all" of their available spare time in the upkeep, development, and other work on their land, 12 per cent spent "a large amount" of their time, 34 per cent spent "a moderate amount", 29 per cent spent "a little", 11 per cent spent none, and 1 per cent were unable to estimate how much of their available spare time they spent on the upkeep of their land. Meyersohn and Jackson (1958:277), in a study of gardening in two Chicago suburbs, found that

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1. The data on the member or members of the sampled households who did most of the gardening are assumed to be unreliable because attribution of work done within households varies with the respondent. See Table 3.08, p. 55.

2. Nineteen per cent of the sampled households (80 households) employed gardeners for some work. Of these 24 per cent (19 households) had all of their gardening done by employees, 54 per cent (43 households) had only their lawn maintenance done by employees, and the remaining 22 per cent (18 households) had only special or difficult tasks done by employees.

TABLE 5.03

THE FREQUENCY OF GARDENING

Frequency of gardening	No. of households	Percentage of sample
Daily	86	20
More than once/week	133	31
Once/week	121	28
Once/fortnight	44	10
Once/month	20	5
Less than once/month	5	1
Never	21	5
Total	430	100

Source: Questionnaire (Question 18)

55 per cent of their respondents spent less than five hours a week working in the garden, 30 per cent spent five to ten hours a week, and 15 per cent spent more than ten hours. The apparent differences between the Meyersohn and Jackson data and the data collected for the present study may result from cultural differences, differences in standards of maintenance between Chicago and Adelaide, or differences in garden size, or they may reflect different phrasing of the questions. Patmore (1972:35-36), in a study of leisure in Great Britain, found that, after watching television, gardening was the most important of all leisure pursuits for men. The men in a survey sample spent an average of 12 per cent of their leisure time gardening and an average of 22 per cent on summer weekdays. For women gardening was the fifth most important leisure activity but participation in gardening activities was as high as participation in any other outdoor activity.

Table 5.06 shows no apparent relationship between frequency of

TABLE 5.04

NUMBER OF HOURS A WEEK SPENT CARING FOR LAWNS, WATERING BY HAND, AND ON OTHER GARDENING TASKS

No. of hours per week	Activity (percentage) N = 430		
	Caring for lawns	Watering by hand	Other gardening activities
None	10	24	14
One	37	15	21
Two	30	13	17
Three	12	5	12
Four	6	10	9
Five	2	6	6
Six-ten	2	19	15
Eleven-twenty	1	6	3
More than twenty	0	2	3
Total	100	100	100

Source: Questionnaire (Questions 46, 47, and 48).

gardening and garden design types. The frequency of gardening is treated as a dichotomous variable: 51 per cent of gardeners worked on their gardens more frequently than once a week and 49 per cent worked once a week or less frequently.

The Quality of Maintenance

"Quality of maintenance" is treated as a trichotomous variable in which the maintenance of front and back gardens is classified as good, moderately good, or poor without any consideration of the nature or number of the design elements. A garden with good maintenance was one

TABLE 5.05

SEASONS OF MAXIMUM GARDENING ACTIVITY

Season	No. of households	Percentage of sample
Never	8	2
Spring only	25	6
Summer only	102	24
Autumn only	23	5
Winter only	16	4
Spring and summer	18	4
Spring and autumn	27	6
Summer and autumn	3	1
Spring, summer and autumn	26	6
Throughout the year	182	42
Total	430	100

Source: Questionnaire (Question 45).

TABLE 5.06

GARDEN DESIGN TYPES BY FREQUENCY OF GARDENING

Garden design type	Frequency of gardening (percentage)	
	More frequently than weekly	Weekly or less frequently
Plain throughout	33	42
Elaborate throughout	31	22
Plain front/elaborate back	29	25
Elaborate front/plain back	7	11
Total	100	100
	n = 211	n = 203

Chi-square test of original data not significant (.20)

Source: Questionnaire (Question 18) and aerial photographs (with unclassified gardens excluded).

TABLE 5.07

THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS

Quality of maintenance	Venue (percentage)	
	Front gardens	Back gardens
Poor	23	39
Moderately Good	58	49
Good	19	12
Total	100	100
	n = 1008*	n = 1040

* Terrace houses and other dwellings without front gardens excluded.

Source: Aerial photographs.

TABLE 5.08

THE QUALITY OF MAINTENANCE OF THE FRONT GARDEN
BY THE QUALITY OF MAINTENANCE OF THE BACK GARDEN

Quality of maintenance of front garden	Quality of maintenance of back garden (percentage)		
	Poor	Moderately good	Good
Poor	49	9	2
Moderately Good	46	75	25
Good	5	16	73
Total	100	100	100
	n = 378	n = 503	n = 127

Chi-square test of original data significant at .001 level

Source: Aerial photographs (with dwellings without front gardens excluded).

in which all elements, espeically the vegetative ones, were well cared for: the lawns were cut and well watered, the edges trimmed, and the flower and vegetable beds free of weeds. A garden with poor maintenance was overgrown, barren, or generally untended. Table 5.07 shows the quality of maintenance of the sampled front and back gardens. Table 5.08 shows that there was a significant relationship between the quality of maintenance of households' front and back gardens. In 65 per cent of the gardens the maintenance of the two venues was of a similar quality, in 27 per cent the quality of maintenance of the front garden was better than that of the back. Eight per cent of the gardens had better maintenance in the back than in the front.

There was a significant relationship between the quality of maintenance of front gardens and the frequency of gardening. Table 5.09 shows that a relatively large percentage of the more frequently tended front gardens had moderately good or good maintenance. Although it was not statistically significant a similar relationship was observed between the frequency of gardening and the quality of maintenance of back gardens. Table 5.10 shows that there was a significant relationship between the quality of maintenance and the design of gardens; poor maintenance was more often associated with plain than with elaborate garden designs.

The Cultivation of Decorative Vegetation and Vegetables

Data on the cultivation of decorative vegetation and vegetables are useful indicators of both the effort put into gardening and attitudes towards gardening because the establishment and maintenance of flower and vegetable gardens are generally time consuming activities. Because many species of flowering plants and virtually all vegetables are annuals their presence in gardens indicates that in most cases their cultivation was undertaken by the household occupying the dwelling at the time of the

TABLE 5.09

THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS BY THE FREQUENCY OF GARDENING

Quality of maintenance of front garden	Frequency of gardening (percentage)	
	More frequently than weekly	Weekly or less frequently
Poor	16	25
Moderately good	61	58
Good	23	17
Total	100	100
	n = 331	n = 83

Chi-square test of original data significant at .05 level

Quality of maintenance of back garden		
Poor	33	42
Moderately good	51	46
Good	16	12
Total	100	100
	n = 333	n = 88

Chi-square test of original data not significant (.20)

Source: Questionnaire (Question 18) and aerial photographs (with dwellings without front gardens excluded from first part of table).

TABLE 5.10

THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS BY GARDEN DESIGN TYPES

Quality of maintenance of front garden	Garden design types (percentage)			
	Plain throughout	Elaborate throughout	Plain front/ elaborate back	Elaborate front/ plain back
Poor	36	9	23	18
Moderately good	54	57	60	70
Good	10	34	17	12
Total	100	100	100	100

Chi-square test of original data significant at .001 level

Quality of maintenance of back garden				
Poor	56	18	30	47
Moderately good	38	59	58	50
Good	6	23	12	3
Total	100	100	100	100
	n = 368	n = 297	n = 250	n = 94

Chi-square test of original data significant at .001 level

Source: Aerial photographs (with unclassified gardens excluded).

TABLE 5.11

THE CULTIVATION OF DECORATIVE VEGETATION

Cultivation of decorative vegetation	No. of gardens	Percentage of sample
None	138	13
Small displays	311	30
Intermediate-sized displays	434	42
Extensive displays	157	15
Total	1040	100

Source: Aerial photographs.

interview; they were seldom relics left by earlier occupants of the dwelling or the results of an interest in gardening that waned long before the time of the interview. The numbers and percentages of the sampled gardens with small, intermediate-sized and large displays of decorative vegetation are shown in Table 5.11. "Small" displays were generally borders along a foot-path or fence line. "Large" displays occupied more than 10 per cent of a front or back garden.

The data on the cultivation of vegetables are taken from the questionnaire because the interpretation of the aerial photographs is assumed to be unreliable.[1] Forty-four per cent of the respondents to the questionnaire said their households grew vegetables and 80 per cent obtained fruit and/or vegetables from their gardens. The percentages of the households' fruit and vegetable requirements obtained from their gardens are shown in Table 5.12. Agreggated over a city or a

1. See Table 3.09, p. 57.

TABLE 5.12

THE PERCENTAGES OF HOUSEHOLD FRUIT AND VEGETABLE REQUIREMENTS OBTAINED FROM GARDENS

Percentage of household requirements	No. of households	Percentage of sample
None	96	22
Less than 1%	72	17
1- 5%	126	29
6-25%	91	21
26-50%	25	6
51-75%	8	2
76-100%	12	5
Total	430	100

Source: Questionnaire (Question 53).

society home food production on this scale represents a substantial percentage of consumption of some commodities and the success of some home producers in meeting their households' needs suggests a potential for greatly increased home production. There is a need in Australia for an analysis of home food production similar to that conducted by Best and Ward (1956) in Great Britain.

The Dynamic Quality of Gardens

An aspect of gardens and gardening easily overlooked by a casual observer is the propensity of householders to change their gardens. Over the long term most householders altered the design of their gardens: 44 per cent of the sampled households (191 households) had developed their gardens when their dwellings were new and 43 per cent (184 households) had changed their gardens at some time during their occupancy.

TABLE 5.13

CHANGES MADE TO GARDENS AND PLANS TO CHANGE GARDENS BY GARDEN DESIGN TYPES

Changes to gardens	Garden design types (percentage)			
	Plain throughout	Elaborate throughout	Plain front/ elaborate back	Elaborate front/ plain back
No changes made or planned	32	56	48	31
Changes planned only	13	9	18	19
Changes made only	22	20	18	25
Changes made and planned	33	15	15	25
Total	100	100	100	100
	n = 146	n = 110	n = 113	n = 36

Chi-square test of original data significant at .001 level

Source: Questionnaire (Question 38) and aerial photographs (with unclassified gardens excluded).

In the short term 57 per cent of the sampled households had changed their gardens during the year prior to the interview and/or planned changes for the subsequent year. The percentages of households with gardens of each design type that made or planned changes are shown in Table 5.13. Households with entirely plain gardens or gardens with one plain venue had a greater propensity to make or plan changes than did households with elaborate gardens. The changes made and planned are described in Tables 5.14 and 5.15 respectively.

The propensity of households to make planned changes was further assessed by a follow-up interview eleven months after the initial

TABLE 5.14

CHANGES MADE TO GARDENS DURING THE YEAR PRIOR TO INTERVIEW

Garden elements	Changes (No. of households) Add	Remove	Alter
Lawn	11		1
Flowers	14	3	1
Vegetables	7	5	3
Flowers and vegetables			2
Shrubs	13	2	1
Fruit trees	4	3	
Ornamental trees	18	5	3
Several vegetative items	6		5
Fences	1		1
Concrete paths and decks	3		
Small capital equipment (swings, etc.)	3		
Large capital equipment (pools, etc.)	6		1
Outhouses		1	
Several capital items	2		
Vegetative plus capital items	17	1	20
Total changed			163
Entire gardens newly established			5
Garden deteriorated			5
No change			233
Condition of garden last year unknown			24
Total			430

Source: Questionnaire (Question 41).

TABLE 5.15

CHANGES PLANNED FOR GARDENS DURING THE YEAR SUBSEQUENT TO INTERVIEW

Garden elements	Changes (No. of households)		
	Add	Remove	Alter
Lawn	13		5
Flowers	10	1	4
Vegetables	4		1
Flowers and vegetables	2		3
Shrubs	6	2	
Fruit trees	3		1
Ornamental trees	11	1	2
Hedges	1		
Several vegetative items	12		8
Fences	4		2
Concrete paths and decks	6		
Small capital equipment (swings, etc.)	3		
Large capital equipment (pools, etc.)	12		1
Outhouses			1
Several capital items	3		1
Vegetative plus capital items	22		10
Total planned change within established gardens			155
Planning to establish new garden			1
No change planned			274
Total			430

Source: Questionnaire (Question 39).

interview when twenty-seven respondents who had planned to alter their gardens were asked whether they had made the planned changes. Eleven of the households had made no changes, six had made the changes planned, seven had made part of the planned changes, and three had made different changes. Of the sixteen households making changes eight had spent less than five days working on the changes, four had spent from five to ten days, and the remaining four had spent more than ten days. The costs of the changes were less than $25 in nine cases, between $25 and $100 in two cases, and over $100 in five cases.

Attitudes Towards Gardening

Ten per cent of the members of the sampled households who did most of the gardening (44 gardeners) regarded gardening as a necessary and unpleasant chore, 34 per cent (144 gardeners) as a chore that was sometimes enjoyed, 41 per cent (174 gardeners) as a pleasant recreation activity, and 11 per cent (49 gardeners) as a major hobby. Four per cent of the respondents (19 respondents) did not answer the question on attitudes because all of their gardening was done by employees. These data confirm the findings of the Australian Broadcasting Commission[1] which found, in a study of recreation activities, that 70 per cent of their 456 respondents regarded "domestic perfunctory hobbies" (sewing, gardening, house repairs, motor repairs) as recreation activities. The results are supported also by the findings of Ward (1970:15) who found that 49 per cent of his respondents regarded gardening as "a pleasure, well worth it", 38 per cent as "a necessary duty but worth it", 4 per cent as "rather an annoying chore", 3 per cent as "a burden they could well do without", and 3 per cent as "outright forced labour". Three per cent of Ward's respondents had no opinion.

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1. *The Mass Media, Hobbies and Interests in Melbourne Homes* (1967:6).

Table 5.16 shows that there was a significant relationship between attitudes towards gardening and the time spent on gardening activities. Gardeners who regarded gardening as a recreation activity or a major hobby tended to spend greater amounts of time gardening than gardeners who derived little enjoyment from the activity. However there were no significant relationships between attitudes towards gardening and the quality of maintenance of either front or back gardens (Table 5.17) or the design classification of gardens (Table 5.18).

The Use of Gardens for Household Ancillary Purposes

Gardens serve as adjuncts to dwellings, providing space for a variety of household tasks and activities which cannot be carried out conveniently inside the dwelling. These household ancillary activities can be classified into four broad groups: maintenance activities such as caring for automobiles, boats, and other equipment, drying laundry, and burning rubbish; productive activities such as growing vegetables and keeping chickens; the storage of items that cannot be kept in the dwelling such as automobiles, boats, tools, and building materials; and the keeping and exercising of animals as pets and show animals. Table 5.19 shows the number and percentage of households using their gardens for various household ancillary purposes. The frequencies of garden use for vehicle maintenance and drying laundry are shown in Table 5.20.

Among household ancillary activities the use of gardens for the keeping of animals is of particular interest because this use has considerable potential impact on the environment and because it is an activity for which it would be difficult to find alternate venues. Animals affect the suburban environment in three ways. First, many animals require enclosures of some sort, items which contribute, often significantly, to the design of gardens. Thirty-three per cent of the

TABLE 5.16

ATTITUDES TOWARDS GARDENING BY TIME SPENT ON GARDENING ACTIVITIES OTHER THAN WATERING AND CARING FOR LAWNS

Attitudes towards gardening	Time spent gardening (percentage)				
	None	1-2 hours	3-4 hours	5-9 hours	More than 9 hours
Unpleasant chore	26	11	7	5	8
Chore sometimes enjoyed	40	44	32	31	12
Recreation activity	28	37	49	50	53
Major hobby	6	8	12	14	27
Total	100	100	100	100	100
	n = 47	n = 159	n = 82	n = 74	n = 49

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 44 and 77) (with 19 non-respondents to Question 44 excluded).

TABLE 5.17

ATTITUDES TOWARDS GARDENING BY THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS

Attitudes towards gardening	Quality of maintenance of front garden (percentage)			Quality of maintenance of back garden (percentage)		
	Poor	Moderately good	Good	Poor	Moderately good	Good
Unpleasant chore	17	10	6	13	11	5
Chore sometimes enjoyed	38	37	28	37	37	27
Recreation activity	37	41	52	38	40	57
Major hobby	8	12	14	12	12	11
Total	100	100	100	100	100	100
	n = 84	n = 236	n = 79	n = 150	n = 196	n = 56

Chi-square test of original data on front gardens not significant (.20)
Chi-square test of original data on back gardens not significant (.30)

Source: Questionnaire (Question 44) and aerial photographs (with non-respondents to Question 44 excluded).

TABLE 5.18

ATTITUDES TOWARDS GARDENING BY GARDEN DESIGN TYPES

Attitudes towards gardening	Garden design types (percentage)			
	Plain throughout	Elaborate throughout	Plain front/ elaborate back	Elaborate front/ plain back
Unpleasant chore	10	10	13	3
Chore sometimes enjoyed	40	30	31	48
Recreation activity	37	50	41	43
Major hobby	13	10	15	6
Total	100	100	100	100
	n = 143	n = 101	n = 111	n = 35

Chi-square test of original data not significant (.30)

Source: Questionnaire (Question 44) and aerial photographs with unclassified gardens and non-respondents to Question 44 excluded).

TABLE 5.19

THE USE OF GARDENS FOR HOUSEHOLD ANCILLARY PURPOSES

Household ancillary use	No. of households	Percentage of sample N = 430
Maintenance -		
Vehicles and boats	304	71
Drying laundry	427	99
Incinerators	358	83
Productive -		
Fruit and/or vegetables	334	78
Chickens	34	8
Storage -		
General	359*	35
Rain-water	400*	38
The keeping of pets	272	63

* Aerial photographs with tree obscured gardens excluded N = 1040

Source: Questionnaire and aerial photographs.

TABLE 5.20

THE FREQUENCY OF GARDEN USE FOR VEHICLE MAINTENANCE AND DRYING LAUNDRY

Frequency of use	Activity (percentage)	
	Vehicle maintenance	Drying laundry
Daily	1	29
More than once/week	5	46
Once/week	26	23
Once/fortnight	17	1
Once/month	16	0
Less than once/month	6	0
Never	29	1
Total	100	100
	N = 430	N = 430

Source: Questionnaire (Question 18).

TABLE 5.21

THE ANIMALS KEPT IN GARDENS

Animals	Number of gardens	Percentage of gardens
None	146	34
Dog only	84	20
Cat only	77	18
Dog and cat	31	7
Small pets (e.g. rabbits) only	10	2
Chickens only	12	3
Dog and/or cat and small pets	48	11
Dog and/or cat and chickens	20	5
Large animals (e.g. horse)	2	<1
Total	430	100

Source: Questionnaire (Question 10).

gardens (143 gardens) had animal pens or houses. Second, many animals, and especially cats and dogs, directly affect the design of gardens by interfering with design elements, particularly vegetation. Third, the excrement of animals has a considerable effect on the quality of run-off water from urban and suburban areas. The animals kept by the sampled households are described in Table 5.21.

Summary

Sixty-five per cent of the sampled gardens had at least one elaborate venue and 82 per cent had at least one venue with moderately good or good maintenance. Most households (87 per cent) had either developed their gardens when their dwellings were new or changed their gardens since they occupied their dwellings and for the majority the design of their gardens was a continuing activity as elements of design were added to gardens, altered, or removed. Fifty-seven per cent had changed their gardens during the year before the interview or planned to change their gardens during the year after the interview.

The design and maintenance of residential gardens requires the investment of considerable amounts of time and energy. One or more members of 95 per cent of the sampled households did some gardening, spending an average of approximately ten hours a week at gardening activities during the busiest period of the year. The amounts of labour, imagination, and money invested in residential gardens suggests that the pride in his accomplishments demonstrated by the gardener described at the beginning of the chapter were typical of the experiences of many gardeners. For so much to be invested in gardens the motivations must be strong. The systematic identification of these motivations is beyond the compass of this study but they must include the pleasure derived from the activity of gardening and the desire to create a pleasant place for

members of households to work and play. Ninety per cent of the gardeners in the sample obtained at least occasional enjoyment from gardening. Most households used their gardens for several forms of household ancillary activities and the majority used their gardens for one or more types of recreation, as the following chapter shows.

A few households in the sample made little or no effort to develop or maintain their gardens and little use of their gardens for household ancillary uses or recreation. In some cases gardens were not used because of illness or infirmity or because the members of households did not have time to spend in their gardens. However other households apparently lacked any motivation to develop, maintain, or use their gardens. It is likely that the motivations that underlie investment in gardens are related to equity in the garden[1] but future studies of motivations may show that a variety of factors influence households and that different motivations operate at different stages in family life cycles. This knowledge may in turn lead to the identification of types of household that could adapt readily to medium-density housing or flats.

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1. See Chapter 7, pp. 172-175.

CHAPTER 6

THE USE OF THE GARDEN FOR RECREATION

The residential garden is the smallest, the most numerous, and, for suburban dwellers, the most accessible element in the hierarchy of outdoor recreation spaces. The garden differs from other outdoor recreation venues in two significant respects. First, the garden is private and its use is limited to the members of a single household and their guests while most other venues are public or semi-private and users may have to queue or compete for space or facilities. Second, access to the garden requires no travel so recreation activities in the garden can be taken up more spontaneously than at other venues.

These two characteristics of gardens probably account for the fact that they are seldom mentioned in the literature on recreation research and planning. Recreation researchers and planners are generally concerned with public facilities and often with the accessibility of facilities to users and potential users. Because the garden is private and perfectly accessible to the majority of households it has received little systematic attention and, as Patmore (1972:36) observes, "Little is known of the role of the garden in recreation as a whole beyond the most simple generalizations, and more needs to be discovered of the effect of a garden on participation in other forms of outdoor recreation."

Gardens are suitable for a variety of active, passive, and social recreation activities and most of the activities discussed here can be, and are, carried out at other venues. However the privacy and accessibility of gardens make them suitable for at least two types of activity not likely to be carried out in public or semi-private venues. The first, gardening, depends on private control over land. The second -- which might be called "crural" recreation -- depends on accessibility because

it is a highly spontaneous activity. Crural recreation is a casual activity which usually involves brief periods during which an individual walks around the garden, inspects aspects of the garden, gets a breath of fresh air, or escapes other members of the household. Although it is likely that gardens are more frequently used for crural recreation than for any other type of activity there are no data on crural recreation in the present study. The questionnaire is too crude an instrument to assess this sort of garden use; accurately kept diaries or sustained observation should provide fruitful information on the frequency, duration, and extent of garden use for crural recreation.

Four aspects of garden use for recreation activities are examined in this chapter. The allocation of time to recreation in the garden is examined in terms of the proportions of their recreation time spent by adults and children in their gardens, the frequency of garden use for various forms of recreation, the amount of time spent on recreation in the garden, and the seasonality of garden use for recreation. The patterns of participation in active and social recreation are described. Basic relationships between recreation and garden design are examined. Finally, the use of the garden for active, passive, and social recreation is compared with the use of other outdoor recreation venues.

The Allocation of Time to Recreation in the Garden

The Frequency of Garden Use for Recreation Activities

Table 6.01 shows the frequency of garden use for six recreation activities. Pollard (1968:68, 76 and 87) presents comparable data on the use of gardens in medium density housing although some of Pollard's categories are different and his frequencies are extremely vague. Forty-five per cent of the gardens in Pollard's sample were used for children's

TABLE 6.01

THE FREQUENCY OF GARDEN USE FOR RECREATION ACTIVITIES

Frequency of use	Activity (percentage) N = 430					
	Playing games or sport	Eating or barbequing	Entertain friends	Reading etc.*	Hobby**	Talking to neighbours
Daily	27	1	1	12	3	20
More than once/week	11	3	4	18	5	21
Once/week	5	12	9	17	6	14
Once/ fortnight	1	10	8	6	2	7
Once/month	2	18	18	4	3	9
Less than once/month	1	18	21	9	3	8
Never	53	38	39	34	78	21
Total	100	100	100	100	100	100

* Reading, sun-bathing, sitting out or sleeping.

** Working on a hobby other than gardening or working on a car or boat.

Source: Questionnaire (Question 18).

play "often" and 3 per cent were used "sometimes", 61 per cent were used for sitting out "often" and 33 per cent "sometimes", 22 per cent were used for eating "often" and 25 per cent "sometimes", 15 per cent were "often" used for barbequing and 13 per cent were "sometimes" used; and 3 per cent of the gardens were "often" used for working on hobbies and 12 per cent were "sometimes" used. There is no significant difference between the percentages of gardens in the two samples that were used for children's play (equating Pollard's category "children playing" with "playing games or sport"). A comparatively large percentage of Pollard's sample used their medium-density gardens for sitting out and comparatively

small percentages used their gardens for eating, barbequing and working on hobbies.

The Time Spent on Recreation Activities in the Garden

Table 6.02 shows the number of hours per week that gardens were used for the three major types of recreation activity -- active, passive, and social -- during the time of year when gardens were used for those activities.[1] The households using their gardens for active recreation spent an average of eleven hours a week at this type of activity; an average of eight hours a week was spent at passive recreation by households using their gardens for those activities; and an average of four hours a week was spent eating, entertaining, and barbequing by households using their gardens for social activities. As would be expected the amount of time spent at recreation activities generally increased as the frequency of use for activities increased; this is illustrated by Table 6.03 in which the time spent at passive activities is cross-tabulated with the frequency of garden use for passive activities. A comparison of the number of hours a week spent at active recreation with the number of hours a week spent at passive recreation in Table 6.04 shows a tendency for households making sustained use of their gardens for active recreation to make relatively sustained use of their gardens for passive recreation. Conversely those spending brief periods at one activity tended to spend brief periods at the other.

The seasonal patterns of garden use for the three major types of recreation are shown in Table 6.05.

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1. A 3 per cent discrepancy will be noted in the percentages of respondents who stated that they did not use their gardens for social recreation shown in Tables 6.01 and 6.02. This discrepancy is due to inconsistancy between the answers to Questionnaire Questions 18 and 29.

TABLE 6.02

NUMBER OF HOURS A WEEK GARDENS WERE IN USE FOR THREE MAJOR TYPES OF RECREATION ACTIVITY

No. of hours	Activity type (percentage N = 430		
	Active	Passive	Social
None	51	34	42
Less than 1 hour	1	5	9
1- 5 hours	12	30	35
6-10 hours	11	15	7
11-15 hours	9	6	4
16-20 hours	6	2	1
More than 20 hours	10	8	2
Total	100	100	100

Source: Questionnaire (Questions 26, 29 and 33).

TABLE 6.03

NUMBER OF HOURS A WEEK GARDENS WERE IN USE FOR PASSIVE RECREATION ACTIVITIES BY FREQUENCY OF USE FOR PASSIVE RECREATION ACTIVITIES

No. of hours	Frequency of use (percentage)	
	More frequently than fortnightly	Fortnightly or less frequently
Less than 1 hour	4	17
1- 5 hours	43	50
6-10 hours	24	21
11-15 hours	9	6
16-20 hours	5	1
More than 20 hours	15	5
Total	100	100
	n = 201	n = 84

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 18 and 33) (with households that did not use garden for passive recreation excluded).

TABLE 6.04

NUMBER OF HOURS A WEEK GARDENS WERE IN USE FOR ACTIVE RECREATION BY NUMBER OF HOURS A WEEK GARDENS WERE IN USE FOR PASSIVE RECREATION

No. of hours of use/week for passive recreation	No. of hours of use/week for active recreation (percentage)			
	None	Less than 5 hours	6-15 hours	More than 15 hours
None	44	15	29	24
Less than 5 hours	32	59	32	23
6-15 hours	17	24	28	23
More than 15 hours	7	2	11	30
Total	100 n = 218	100 n = 59	100 n = 83	100 n = 70

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 26 and 33).

The Proportions of Recreation Time Spent Outdoors and in the Garden

Although the data on the frequency of garden use for recreation activities and on the amount of time spent at those activities indicate the extent of garden use they provide little insight into the importance of the garden as a recreation venue compared to other outdoor recreation venues. An attempt was made to assess the recreation importance of gardens by asking what proportion of adults' and children's recreation time were spent outdoors and what proportions of their outdoor recreation time were spent in the garden. The question was very general, applying to annual recreation time rather than a particular season. Recreation time was defined as "time that is not spent working, doing chores, eating or sleeping". The data on adults' and children's recreation time are

TABLE 6.05

THE SEASON OF GARDEN USE FOR THREE MAJOR TYPES OF RECREATION ACTIVITY

Season(s)	Activity type (percentage) N = 430		
	Active	Passive	Social
None	51	34	42
Spring only	<1	1	1
Summer only	16	38	34
Autumn only	0	<1	1
Winter only	1	<1	1
Spring and summer only	<1	2	3
Spring and autumn only	1	3	4
Summer and autumn only	1	2	1
Spring, summer and autumn only	4	6	4
Throughout the year	25	14	9
Total	100	100	100

Source: Questionnaire (Questions 25, 28, and 32).

TABLE 6.06

PROPORTION OF ADULTS' RECREATION TIME SPENT OUTDOORS BY PROPORTION OF ADULTS' OUTDOOR RECREATION TIME SPENT IN THE GARDEN

Proportion of rec. time spent in the garden	Proportion of rec. time spent outdoors (percentage)		
	Less than half	About half	More than half
Less than half	47	35	45
About half	15	33	19
More than half	38	32	36
Total	100	100	100
	n = 167	n = 138	n = 125

Source: Questionnaire (Questions 19 and 20).

TABLE 6.07

PROPORTION OF CHILDREN'S RECREATION TIME SPENT OUTDOORS BY PROPORTION OF CHILDREN'S OUTDOOR RECREATION TIME SPENT IN THE GARDEN

Proportion of rec. time spent in the garden	Proportion of rec. time spent outdoors (percentage)		
	Less than half	About half	More than half
Less than half	52	29	38
About half	22	31	25
More than half	25	40	37
Total	100	100	100
	n = 40	n = 55	n = 146

Source: Questionnaire (Questions 21 and 22).

TABLE 6.08

PROPORTION OF CHILDREN'S OUTDOOR RECREATION TIME SPENT IN THE GARDEN BY PROPORTION OF ADULTS' OUTDOOR RECREATION TIME SPENT IN THE GARDEN

Households with children	Proportion of adults' time in garden (percentage)		
Proportion of children's time in garden	Less than half	About half	More than half
Less than half	28	21	14
About half	16	16	11
More than half	17	15	27
Sub-total	61	52	52
Chi-square test of original data significant at .01 level			
Adults in households without children	39	48	48
Total	100	100	100
	n = 184	n = 94	n = 152

Source: Questionnaire (Questions 20 and 22).

presented in Tables 6.06 and 6.07 respectively. Each table is based on a cross-tabulation of the proportion of recreation time spent outdoors with the proportion of outdoor recreation time spent in the garden. The tables show similar patterns: 61 per cent of the adults and 83 per cent of the children spent at least half of their recreation time outdoors; 57 per cent of the adults and 51 per cent of the children spent at least half of their outdoor recreation time in the garden. Comparatively large percentages of both adults and children who spent half of their recreation time outdoors spent half or more of their outdoor recreation time in the garden.

Table 6.08 compares the proportion of children's outdoor recreation time spent in the garden with the proportion of adults' outdoor recreation time spent in the garden. In households where the adults spent more then half of their recreation time in the garden there was a tendency for children to spend more than half of their time in the garden. Adults in households with no children had a greater propensity to spend half or more of their outdoor recreation time in their gardens than adults in households with children.

These data must be interpreted with caution because adults generally answered the questions about the behaviour of children. This may account for the similarity between the behaviour of the two groups shown by Tables 6.06 and 6.07 and for the correspondance between children's and adults' behaviour shown in Table 6.08. Despite this, the data do indicate the relative importance of the garden as a venue for recreation.

Participation in Recreation Activities

The members of the sampled households who made most use of their

TABLE 6.09

PARTICIPATION IN ACTIVE AND PASSIVE RECREATION ACTIVITIES IN THE GARDEN

Member(s) of household	Activity type (percentage) N = 430	
	Active	Passive
None	51	34
Male adult only	4	10
Female adult only	1	16
Two or more adults	2	12
One child	9	5
Two or more children	24	8
One or more adults and one or more children	9	15
Total	100	100

Source: Questionnaire (Questions 24 and 31).

gardens for active and passive recreation are listed in Table 6.09. Gardens were generally used for social recreation by several or all members of households and often by guests.

Recreation and the Design of Gardens

There was no statistically significant relationship between the use of gardens for recreation and the design classification of gardens. Table 6.10 shows the percentages of households with gardens of each design type that used their front and back gardens for recreation activities. The principal impact of recreation on garden design is in the installation of design elements directly related to recreation: major facilities such as swimming pools, permanent facilities for adults'

TABLE 6.10

THE USE OF FRONT AND BACK GARDENS FOR RECREATION BY GARDEN DESIGN TYPE

	Type of garden (percentage)			
Use of front garden	Plain throughout	Elaborate throughout	Plain front/ elaborate back	Elaborate front/ plain back
Do not use front	66	75	73	67
Use front	34	25	27	33
Total	100	100	100	100

Chi-square test of original data not significant (.50)

Use of back garden				
Do not use back	14	24	14	17
Use back	86	76	86	83
Total	100	100	100	100
	n = 146	n = 110	n = 113	n = 36

Chi-square test of original data not significant (.20)

Source: Questionnaire (Question 34) and aerial photographs.

recreation such as outdoor furniture, patios, and sun-decks, and permanent facilities for children's play such as swing-sets, sand-boxes, and cubby-houses. Tables 6.11 and 6.12 show significant relationships between the inclusion in gardens of swimming pools and adults' recreation facilities and the use of gardens for entertaining. Comparatively large percentages of households with these facilities used their gardens for entertaining and there was a tendency for households with these facilities to entertain relatively frequently. Table 6.13 shows

TABLE 6.11

THE FREQUENCY OF GARDEN USE FOR ENTERTAINING
BY HOUSEHOLDS WITH AND WITHOUT SWIMMING POOLS

Frequency of entertaining	Facility (percentage)	
	Swimming pool	No swimming pool
More frequently than fortnightly	25	14
Fortnightly or less frequently	66	44
Never	9	42
Total	100 n = 32	100 n = 389

Chi-square test of original data significant at .01 level

Source: Questionnaire (Question 18) and aerial photographs.

TABLE 6.12

THE FREQUENCY OF GARDEN USE FOR ENTERTAINING
BY HOUSEHOLDS WITH AND WITHOUT
ADULTS' RECREATION FACILITIES

Frequency of entertaining	Facility (percentage)	
	Permanent rec. facilities	No permanent rec. facilities
More frequently than fortnightly	21	13
Fortnightly or less frequently	51	45
Never	26	42
Total	100 n = 60	100 n = 361

Chi-square test of original data significant at .05 level

Source: Questionnaire (Question 18) and aerial photographs.

TABLE 6.13

THE PROPORTION OF OUTDOOR RECREATION TIME SPENT IN THE GARDEN BY CHILDREN IN HOUSEHOLDS WITH AND WITHOUT SPECIAL PLAY FACILITIES

Proportion of children's outdoor recreation time spent in the garden	Facility (percentage)	
	Play area	No play area
Less than half	43	38
About half	18	27
More than half	39	35
Total	100 n = 44	100 n = 193

Chi-square test of original data not significant (.50)

Source: Questionnaire (Question 22) and aerial photographs.

that there was no significant relationship between the proportion of children's outdoor recreation time spent in their gardens and the provision of special play facilities.

A Comparison of Garden Use with the Use of Other Recreation Venues

The use of front and back gardens for the three types of recreation activity and for four groups of recreation activities are compared in Table 6.14 with the use of five other outdoor recreation venues. The table shows that the back garden was used by more households than any of the other six venues and the back garden was used by a relatively large percentage of households for two or more types of activity. Seventy-four per cent of the users of back gardens used them

TABLE 6.14

THE USE OF SELECTED RECREATION VENUES BY ACTIVITY TYPES

Activity type	Venue (percentage) N = 430						
	Back Garden	Front Garden	Neighbour-hood*	Local Park	Beach	Rural Park	Private Club
Passive only	12	10	3	2	13	4	1
Active only	3	9	10	19	8	4	16
Social only	6	1	5	3	2	8	1
Passive and active	8	4	2	3	8	1	1
Passive and social	20	2	1	0	6	1	1
Active and social	3	1	1	2	2	2	4
Passive, active and social	30	2	1	2	8	4	1
None	18	71	77	69	53	76	75
Total	100	100	100	100	100	100	100

* In neighbours' gardens or in the street.

Source: Questionnaire (Question 34).

for two or more activities while only 52 per cent of the users of the beach -- the next most often used venue for more than a single activity -- used the beach for two or more activities.

There are no directly comparable data although Devine (1968:26) compares the use of front, back, and side gardens for recreation in his study of two Sydney suburbs. Devine found that 63 per cent of the households in his Castlecrag sample used the back garden most for recreation, 20 per cent used the front garden most, 14 per cent used the two venues equally, and 3 per cent used side gardens. In the second

suburb, St. Peters, 64 per cent used the back garden most, 21 per cent used the front garden most, 9 per cent used the two venues equally, and 6 per cent used side gardens most.

There was a tendency for households using other venues for recreation to also use the back garden. Ninety-one per cent of the households that used the beach for recreation also used the back garden but only 74 per cent of the households that did not use the beach used the back garden. Similar relationships were found between the use of all other venues and the use of the back garden.

Summary

Eighty five per sent of the sampled households used their gardens for at least one type of recreation activity. Most of this activity took place in back gardens, front gardens being reserved by most households for display. Sixty-one per cent of the households used their back gardens for two or more types of recreation and this percentage would undoubtedly be larger if gardening (when it is regarded as a recreation activity or hobby) and crural recreation were included in the analysis. Of the three main categories of recreation, gardens were most often used for passive activities. Members of 66 per cent of the sampled households -- mostly adults -- used their gardens for passive recreation, usually during summer, usually more frequently than once a week, and for an average of approximately seven hours a week. Passive recreation was followed by social recreation which typically involved several members of households and which was undertaken by 58 per cent of the households at an average frequency of more than once a week, for an average of four hours a week, and usually during summer. Active recreation was undertaken by 49 per cent of the sampled households, mainly by children. Gardens were typically used for active recreation

throughout the year, more frequently than once a week, and for an average of eleven hours a week.

Two considerations demonstrate the importance of residential gardens as outdoor recreation venues: 57 per cent of the adults in the sampled households and 51 per cent of the children spent at least half of their outdoor recreation time in their gardens, and the back garden was used for more recreation activities by more households than any other single venue. In light of these data it is surprising that residential gardens are virtually ignored in the literature on outdoor recreation.

CHAPTER 7

FACTORS RELATED TO AND AFFECTING THE USE AND DESIGN OF RESIDENTIAL GARDENS

In the two preceding chapters gardens are described without reference to the many factors influencing their use and design. In this chapter the relationships between use and design and a number of these factors are examined. Many of these relationships are apparent, in general terms, in the results of the cluster analysis (Chapter 4) including relationships between the size of gardens and their design, between the age of dwellings and the design of gardens, between preferred block sizes and the use of gardens, and between the structure and characteristics of households and the use and design of gardens. Other factors discussed in this chapter include boundary demarcation preferences, external influences on garden design, and problems encountered in the use of the garden.

The Size of Residential Blocks

Although the purpose of this study is to describe the use and design of gardens in standard or traditional suburban housing the random sample included a number of small gardens and the data on the use and design of these small gardens provide an opportunity to compare small gardens with those of standard-sized and large residential blocks. Unfortunately the numbers of detached dwellings on small blocks and terrace houses in the questionnaire sample are too small to permit the use of chi-square or other tests of significance. Nevertheless cross-tabulations of many aspects of garden use and design with the size of the gardens indicate that the amount of space available is a fundamental consideration in the use and design of gardens.

Block Size and the Design of Residential Gardens

The relationships between three variables -- the size of gardens, the nature of occupancy, and garden design types -- are shown in Table 7.01.[1] The table shows that plain gardens and gardens with plain venues are often associated with rented dwellings and that small blocks have a comparatively large percentage of plain gardens and gardens with plain venues. These relationships are particularly well illustrated by the design types of the gardens in the semi-detached blocks and the small detached blocks. The gardens of the semi-detached dwellings -- most of which were rented from the South Australian Housing Trust -- tended to be plain: two-thirds of the semi-detached dwellings were rented and had entirely plain gardens. Regardless of the nature of occupancy a comparatively large percentage of the gardens associated with detached dwellings on small blocks were plain, presumably because there is insufficient space in small blocks to develop elaborate gardens -- to accumulate numerous elements of design -- and at the same time retain relatively open space for recreation or household ancillary activities. Table 7.02 shows the relationship between block size and a single element of design, adults' recreation facilities. The percentages of gardens with recreation facilities increased as block sizes increased.

Block Size and Gardening

The relationships between the size of blocks and the frequency of gardening, the cultivation of flowers and vegetables, and the quality of maintenance of front and back gardens are shown in Tables 7.03, 7.04, and

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1. The basic block sizes are described in Chapter 2, pp.23-30. "Large" blocks with detached dwellings are larger than 690 square metres (7,500 square feet), often corner blocks or double blocks. "Small" blocks are smaller than 560 square metres (6,000 square feet).

TABLE 7.01

GARDEN DESIGN TYPES BY SIZE OF BLOCK AND NATURE OF OCCUPANCY

Garden design type	Size of block and nature of occupancy (percentage)											
	Large detached			Standard detached			Small detached			Semi-detached		
	O	B	R	O	B	R	O	B	R	O	B	R
Plain throughout	10	35	43	28	40	46	71	25	100	33	0	79
Elaborate throughout	52	25	14	34	23	19	0	25	0	33	0	4
Plain front/elaborate back	28	25	29	34	26	12	29	50	0	33	100	13
Elaborate front/plain back	10	15	14	4	11	23	0	0	0	0	0	4
Total	100	100	100	100	100	100	100	100	100	100	100	100
	n = 29	n = 20	n = 7	n = 126	n = 167	n = 26	n = 7	n = 4	n = 2	n = 3	n = 1	n = 23

O - Owned
B - Buying
R - Renting

Source: Questionnaire (Question 77) and aerial photographs (with unclassified gardens excluded).

TABLE 7.02

ADULTS' RECREATION FACILITIES BY SIZE OF BLOCK

Facility	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
Adults' recreation area	23	14	2	8	0
No adults' recreation area	77	86	98	92	100
Total	100	100	100	100	100
	n = 155	n = 750	n = 41	n = 72	n = 22

Chi-square test of original data significant at .001 level

Source: Aerial photographs.

TABLE 7.03

THE FREQUENCY OF GARDENING BY THE SIZE OF BLOCK

Frequency of gardening	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
More frequently than weekly	55	53	57	26	17
Weekly or less frequently	45	47	43	74	83
Total	100	100	100	100	100
	n = 60	n = 323	n = 14	n = 27	n = 6

Source: Questionnaire (Question 18) and aerial photographs.

TABLE 7.04

THE CULTIVATION OF VEGETABLES BY THE SIZE OF BLOCK

Cultivation of vegetables	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
Vegetables	55	44	50	33	0
No vegetables	45	56	50	67	100
Total	100	100	100	100	100
	n = 60	n = 323	n = 14	n = 27	n = 6

Source: Questionnaire (Question 8) and aerial photographs.

TABLE 7.05

THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS BY THE SIZE OF BLOCK

Quality of maintenance of front gardens	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
Poor	17	22	39	42	No front
Moderately good	62	58	46	48	
Good	21	20	15	10	
Total	100	100	100	100	

Chi-square test of original data significant at .001 level

Quality of maintenance of back gardens					
Poor	34	34	63	69	91
Moderately good	50	53	27	25	9
Good	16	13	10	6	0
Total	100	100	100	100	100
	n = 155	n = 750	n = 41	n = 72	n = 22

Chi-square test of original data significant at .001 level.

Source: Aerial photographs.

7.05 respectively. Although approximately the same percentages of households with detached dwellings on large, standard-sized, and small blocks worked in their gardens more frequently than weekly, relatively small percentages of gardeners with semi-detached and terrace-sized gardens worked that frequently. In general gardening activity decreased as garden sizes decreased; Tables 7.04 and 7.05 show that the percentages of gardeners growing vegetables and the percentages of gardens with moderately good or good maintenance both decreased as gardens became smaller.

Block Size and the Use of Gardens for Household Ancillary Purposes

Table 7.06 shows the percentages of households that used the five sizes of gardens for washing and maintaining vehicles. Comparatively few households with small gardens used their gardens for these activities. Table 7.07 shows the keeping of animals was not sensitive to the amount of space available although households with standard-sized, semi-detached, and terrace gardens seldom kept chickens.

Block Size and the Use of Gardens for Recreation

Tables 7.08 and 7.09 show the relationships between block size and the proportions of adults' and children's outdoor recreation time spent in gardens and the frequency of garden use for selected recreation activities. Although comparatively small percentages of adults with small gardens spent half or more of their recreation time in the garden the use of gardens by children was relatively unaffected by the amount of space available. The use of gardens for passive recreation (often a solitary adult activity) and active recreation (largely the province of children) was not affected by the amount of space available. Comparatively small percentages of small gardens were used for social activities -- eating and entertaining -- and those small gardens used for these

TABLE 7.06

THE USE OF GARDENS FOR VEHICLE MAINTENANCE BY THE SIZE OF BLOCK

Use for vehicle maintenance	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
Use garden	65	76	50	52	0
Do not use garden	35	24	50	48	100
Total	100	100	100	100	100
	n = 60	n = 323	n = 14	n = 27	n = 6

Source: Questionnaire (Question 18) and aerial photographs.

TABLE 7.07

THE KEEPING OF ANIMALS BY THE SIZE OF BLOCK

Animals	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
None	33	36	36	15	33
Pets only	47	59	50	78	67
Chickens (and pets)	20	5	14	7	0
Total	100	100	100	100	100
	n = 60	n = 323	n = 14	n = 27	n = 6

Source: Questionnaire (Question 10) and aerial photographs.

TABLE 7.08

PROPORTIONS OF ADULTS' AND CHILDREN'S OUTDOOR RECREATION TIME SPENT IN GARDENS BY THE SIZE OF BLOCK

	Size of block (percentage)				
Proportion of adults' outdoor rec. time spent in garden	Large detached	Standard detached	Small detached	Semi-detached	Terrace
Less than half	40	41	50	63	83
About half	22	22	29	22	0
More than half	38	37	21	15	17
Total	100 n = 60	100 n = 323	100 n = 14	100 n = 27	100 n = 6
Proportion of children's outdoor rec. time spent in garden					
Less than half	58	34	29	53	100
About half	16	28	14	20	0
More than half	26	38	57	27	0
Total	100 n = 31	100 n = 187	100 n = 7	100 n = 15	100 n = 1

Source: Questionnaire (Questions 20 and 22) and aerial photographs.

TABLE 7.09

THE FREQUENCY OF GARDEN USE FOR SELECTED RECREATION ACTIVITIES BY THE SIZE OF BLOCK

	Size of block (percentage)				
Frequency of use for passive recreation	Large detached	Standard detached	Small detached	Semi-detached	Terrace
More frequently than fortnightly	38	50	50	37	17
Fortnightly or less frequently	22	20	14	19	0
Never	42	30	36	44	83
Total	100	100	100	100	100
Frequency of use for social recreation - eating and barbequing					
More frequently than fortnightly	22	16	14	4	0
Fortnightly or less frequently	42	49	22	41	17
Never	36	35	64	55	83
Total	100	100	100	100	100
Frequency of use for social recreation - entertaining					
More frequently than fortnightly	20	14	7	7	0
Fortnightly or less frequently	43	50	43	30	0
Never	37	36	50	63	100
Total	100	100	100	100	100
Use for active recreation					
Active recreation	33	46	50	33	0
No active recreation	67	54	50	67	100
Total	100 n = 60	100 n = 323	100 n = 14	100 n = 27	100 n = 6

Source: Questionnaire (Question 18) and aerial photographs.

TABLE 7.10

GARDEN DESIGN TYPE BY DATE OF CONSTRUCTION OF DWELLING

Garden design type	Date of construction (percentage)				
	1968-1972	1963-1967	1953-1962	1923-1952	Before 1923
Plain throughout	68	49	30	29	29
Elaborate throughout	11	12	37	34	19
Plain front/elaborate back	16	30	24	29	39
Elaborate front/plain back	5	9	9	8	13
Total	100	100	100	100	100
	n = 19	n = 96	n = 117	n = 142	n = 31

Chi-square test of original data significant at .001 level

Source: Questionnaire (Question 13) and aerial photographs (with unclassified gardens excluded).

activities tended to be used less frequently than were standard-sized and large gardens.

The Age of Dwellings

Garden designs are related to the age of dwellings in two ways. First, dwellings built before the introduction of contemporary block size and siting regulations are often on small blocks. Second, design elements tend to accumulate in gardens; Tables 5.14 and 5.15[1] show that most of the changes occurring in gardens involve the addition of design elements rather than their removal or alteration. Table 7.10 shows how the percentage of gardens with elaborate venues increases with the age of dwellings.

1. pp. 103 and 104.

Garden Design Preferences

Block Size Preferences

Because the amount of space available in gardens is an important factor in garden use and design an attempt was made to ascertain which of six garden sizes members of the sampled households preferred. The six choices included a self-contained flat with no private garden space and five sizes of block, each occupied by the same dwelling.[1] Like the answers to all hypothetical choice questions the data on preferred block size must be interpreted with caution because it is difficult for respondents to divorce themselves from reality and the choice of block sizes in the market is limited. Small blocks are rare in many parts of Adelaide because building and development control Acts have imposed minimum sizes on the development of new blocks. Those small blocks that do exist are often occupied by old dwellings, expensively renovated dwellings, or new townhouses. Large blocks, when they are available, may be prohibitively expensive for some home purchasers. It is possible, therefore, a home seeker might prefer a particular block size but have little choice within the locational and financial constraints which govern his decision.

Block size preferences and the stated reasons for preferences are shown in Table 7.11. Most respondents who stated preferences for flats and small gardens did not enjoy gardening or were unable to maintain gardens because they lacked time or because they were unwell or infirm. A number of respondents who stated preferences for standard-sized blocks were apparently simply accepting the *status quo:* the standard block was "adequate". Others do not appear to have considered the smaller alternatives, 20 per cent of those who chose the standard block gave as

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1. The choices were illustrated as shown in the Appendix, p. 217.

TABLE 7.11

PREFERRED BLOCK SIZES AND REASONS FOR PREFERENCES

Reason for preference	Preferred block size (percentage)				
	Flat	Court-yard	Small block	Standard block	Large block
Enjoy gardening	0	0	0	7	8
Suitable for children	0	0	1.5	8	12
Provides privacy	0	3	3	6	13
Provides natural setting	0	0	1.5	1	7
Provides space for a particular use	0	0	1.5	6	9
Like large areas	0	0	1.5	12	46
Adequate	0	10	14	37	3
Do not like gardening	50	27	24	3	1
Unable to look after (large) garden	50	60	53	20	1
Total	100	100	100	100	100
	n = 8	n = 30	n = 66	n = 190	n = 136

Source: Questionnaire (Questions 67 and 68).

the reason for their choice the opinion that large blocks were "too big". In Tables 7.12 and 7.13 block size preferences are cross-tabulated with the existing block sizes and with the use of the back garden for recreation. Table 7.12 shows a tendency for respondents to state a preference for the block size they occupied at the time of the interview. Forty-four per cent of the respondents stated preferences for their existing block size, 29 per cent for larger blocks than they occupied at the time of the interview, and 27 per cent for smaller blocks or flats. Table 7.13 shows that block size preferences tended to reflect the use of gardens for recreation. Half of the respondents in households that did not use their

TABLE 7.12

PREFERRED BLOCK SIZES BY THE SIZE OF BLOCK

Preferred block size	Size of block (percentage)				
	Large detached	Standard detached	Small detached	Semi-detached	Terrace
Large block	44	29	43	29	17
Standard block	36	47	21	41	17
Small block	13	16	21	15	0
Court-yard	7	6	14	11	33
Flat	0	2	0	4	33
Total	100	100	100	100	100
	n = 60	n = 323	n = 14	n = 27	n = 6

Source: Questionnaire (Question 67) and aerial photographs.

TABLE 7.13

PREFERRED BLOCK SIZES BY USE OF THE BACK GARDEN FOR RECREATION

Preferred block size	Use of back garden (percentage)	
	Use back	Do not use back
Large block	34	21
Standard block	48	29
Small block	12	29
Court-yard	5	16
Flat	1	6
Total	100	100
	n = 353	n = 77

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 34 and 67).

back gardens for recreation stated preferences for small blocks or flats but only 18 per cent of those in households that did use their back gardens for recreation stated preferences for small gardens.

Boundary Demarcation Preferences

Garden designs and the individual elements of garden design are expressions of householders' tastes. The data on the dynamic quality of gardens in Tables 5.13 to 5.15 suggest that many householders were moving towards some ultimate expression of their tastes or changing their gardens to reflect changing tastes. Many preferred designs may never be realized, however, for lack of money, time, or energy. It is desirable therefore to assess the extent to which existing garden designs correspond with the tastes -- expressed as design preferences -- of householders. Because it is beyond the scope of the study to examine households' preferences for a large range of garden design elements detailed discussion of preferences is limited to a single element of design: the demarcation of front and back boundaries. Boundary demarcations were chosen as an example of design preferences for three reasons. First, boundary demarcations are prominent, permanent and potentially expensive elements of design and most households are likely, therefore, to consider their choice of demarcations more carefully than they might consider smaller or less expensive elements of design. Second, fences and walls are a significant element of the suburban landscape, especially the landscape as it is viewed from the street. Third, fences and walls are means of asserting territoriality and achieving a degree of privacy and consequently they are psychologically as well as aesthetically important.

Preferred and existing front boundary demarcations are shown in Table 7.14 and the stated reasons for the preferences in Table 7.15. Equivalent data for back boundary demarcations are shown in Tables 7.16

TABLE 7.14

PREFERRED FRONT BOUNDARY DEMARCATION BY EXISTING FRONT BOUNDARY DEMARCATION

Preferred front demarcation	Existing front demarcation (percentage)					
	None	Wire	Wood	Wrought iron	Hedge/ brush	Brick/ concrete
None	44	10	9	20	6	7
Wire	2	55	4	0	0	0
Wood	8	4	31	0	3	2
Wrought iron	1	2	2	56	9	0
Hedge/brush	16	11	16	12	71	4
Brick/concrete	29	18	38	12	11	87
Total	100 n = 100	100 n = 97	100 n = 55	100 n = 25	100 n = 35	100 n = 118

Note: The category "wire" includes all cyclone and post and wire fences; "wood" includes wooden picket and post and rail fences; "hedge/ brush" includes living hedges and woven brush fences; and "brick/ concrete" includes brick, concrete and stone walls. The average existing and preferred heights of all forms of demarcation except hedge/brush were approximately 1 metre. The average existing height of hedge/brush demarcations was 1.5 metres and the average preferred height was 1.9 metres.

Source: Questionnaire (Questions 61 and 62).

and 7.17. Data are missing in Tables 7.15 and 7.17 because there were no clear instructions in the questionnaire to record reasons for preferences if the existing demarcation types were preferred.

The majority of respondents (60 per cent) stated preferences for the existing type of front boundary demarcation. Comparatively small percentages of respondents with open fronts and wooden picket or post and rail fences preferred these forms of demarcation, however. Forty-seven per cent of the respondents gave aesthetic reasons for their preferences; these were stated in several ways: a particular type of demarcation "suited the style of the house", "fitted in with other houses

TABLE 7.15

REASON FOR FRONT BOUNDARY DEMARCATION PREFERENCE BY PREFERRED FRONT BOUNDARY DEMARCATION

Reason for preference	Preferred front demarcation (percentage)					
	None	Wire	Wood	Wrought iron	Hedge/ brush	Brick/ concrete
Appearance	92	35	56	52	35	34
Barrier	0	10	19	5	6	19
Privacy/security	0	0	6	0	45	10
Durability	0	18	0	19	4	13
Retaining wall	0	0	0	0	0	3
Indifferent	1	9	16	5	0	3
No response recorded	7	28	3	19	10	18
Total	100 n = 74	100 n = 57	100 n = 32	100 n = 21	100 n = 69	100 n = 177

Note: See Table 7.14 for description of fence type categories.

Source: Questionnaire (Questions 62 and 63).

TABLE 7.16

PREFERRED BACK BOUNDARY DEMARCATION BY EXISTING BACK BOUNDARY DEMARCATION

Preferred back demarcation	Existing back demarcation (percentage)				
	Corrugated iron	Wood paling	Hedge/ brush	Brick/ concrete	Other
Corrugated iron	83	36	17	0	57
Wood paling	7	50	0	12	14
Hedge/brush	7	10	83	25	0
Brick/concrete	3	2	0	63	0
Other	0	2	0	0	29
Total	100 n = 316	100 n = 87	100 n = 12	100 n = 8	100 n = 7

Note: See Table 7.14 for descriptions of "hedge/brush" and "brick/ concrete" demarcation type categories. Average existing and preferred heights for all categories except "other" ranged from 1.5 to 1.8 metres. The "other" category included wire fences of 1 metre.

Source: Questionnaire (Questions 64 and 65).

TABLE 7.17

REASON FOR BACK BOUNDARY DEMARCATION PREFERENCE
BY PREFERRED BACK BOUNDARY DEMARCATION

Reason for preference	Preferred back demarcation (percentage)				
	Corrugated iron	Wood paling	Hedge/ brush	Brick/ concrete	Other
Privacy	25	20	25	35	0
Durability	28	4	5	18	0
Appearance	9	41	56	29	100
Barrier	5	0	0	6	0
Indifferent	13	20	2	0	0
No response recorded	20	15	12	12	0
Total	100	100	100	100	100
	n = 299	n = 66	n = 43	n = 17	n = 5

Note: See Tables 7.14 and 7.16 for descriptions of demarcation types.

Source: Questionnaire (Questions 65 and 66).

in the street", or simply "looked good". Open fronts, wooden picket or post and rail fences, and wrought iron fences were often chosen for aesthetic reasons. One quarter of the respondents gave the need for privacy or the need for a barrier (to keep animals or children in or animals, children, trespassers, or garbage out) as the reasons for their preferences; most of those who gave these reasons stated preferences for hedges or brush fences or brick, stone or concrete walls.

Three quarters of the respondents were satisfied with their existing back boundary demarcations, almost universally corrugated iron or wood paling fences. Privacy and durability were the most common reasons for preferring corrugated iron fences and appearance and privacy the most

common for preferring wood paling.

Social Pressures and Legal Constraints

In an attempt to assess the extent to which households are influenced by social pressures respondents were asked whether they would exert pressure if a new household moved into the street and failed to care for their garden, allowing it to collect rubbish and become overgrown. The distribution of responses to the question is shown in Table 7.18. Many respondents who said that they would offer to help neighbours with gardening qualified their answer by specifying that the neighbours would have to be unable to do the gardening themselves. These data indicate that the potential use of social pressure is widespread, 42 per cent of the respondents said that they would take some sort of action if the maintenance of a neighbour's garden was very poor. Interestingly, no evidence was found that the responses to this question were related to the design or maintenance of respondents' gardens or to the characteristics of the respondents' households. Potential social pressure to maintain standards was also apparent in the responses to a question on the importance of front garden design and maintenance in the follow-up interview; twenty-five of the twenty-seven respondents said that they felt that front gardens should be well maintained. These data generally support Meyersohn and Jackson's (1958:274) findings; 39 per cent of their respondents in Chicago "expected" neighbours to maintain well kept lawns and 41 per cent "expected" neighbours to cultivate at least a few flowers. Social pressure to conform can take either overt or covert forms. Offers to help a neighbour with gardening and threats to take some form of action are essentially overt. Gans (1967:48), in his study of Levittown, describes the use of covert pressure through chiding and banishment from the Saturday afternoon gardening fraternity.

TABLE 7.18

ANTICIPATED REACTION TO POOR MAINTENANCE
IN NEIGHBOURS' GARDENS

Reaction	No. of respondents	Percentage of respondents
Offer to help neighbours with garden	55	13
Suggest that neighbours tidy up garden	63	15
Threaten action	4	1
Complain to authority	54	12
Take other action	6	1
Do nothing	248	58
Total	430	100

Source: Questionnaire (Question 69).

Legal controls over the design and use of gardens are of three types. Building acts and development control acts set the minimum areas of allotments and determine minimum dimensions for the placement of dwellings within allotments. Land use zoning laws control the type of devleopment which can occur within an area and the uses that can be made of land within zones. Finally, a plethora of by-laws, intended to protect the health and safety of inhabitants of an area and to preserve the amenity of the area, control many aspects of garden design and use ranging from the standards to be met in the keeping, housing, and control of animals to restrictions on the erection of fences near roadway intersections. Many of these by-laws give local government authorities powers to order or to carry out changes or improvements at the owner's expense if elements of garden design are judged to be hazardous, potentially dangerous to health, or offensive.

Most respondents were either unaware of legal controls on the use

of their gardens or did not feel that those controls of which they were aware constrained their use and design of their gardens. Respondents were asked whether the use they made of their gardens was in any way affected by any state or local government laws or regulations. Eighty-seven per cent (376 respondents) did not feel that they were affected. Of those who stated they were affected 39 per cent (21 respondents) mentioned seasonal bans on the burning of rubbish, 13 per cent (7 respondents) mentioned restrictions on planting near drains, foundations, and roadways, 11 per cent (6 respondents) mentioned seasonal restrictions on watering, and the remaining respondents mentioned restrictions on the construction of fences near intersections, their responsibilities as tenants for the maintenance of gardens and nature strips, regulations governing the use of gardens for business purposes, restrictions in building acts on the siting of dwellings within the block, restrictions on the keeping and control of animals, and restrictions under decency laws which prohibit nude sun-bathing.

External Problems and the Use of the Garden

A variety of external factors, such as noise, smells, or insects, can disturb individuals using gardens or even limit the use of gardens. The numbers of households where the respondents were conscious of such problems and the actions taken, if any, to counteract the problems are shown in Table 7.19. Few respondents found external problems so worrying and intractable that they limited the use of the garden. Only 7 per cent of the sampled households (30 households) were kept out of their gardens by external problems: nine by smoke, seven by insects, five by smells, two by animals, and one each by seven other problems.

TABLE 7.19

PROBLEMS ENCOUNTERED IN THE GARDEN AND ACTIONS TAKEN TO COUNTERACT PROBLEMS

Type of problem	Actions taken to counteract problems (No. of households)				
	None	Complain	Direct Action	Withdraw from problem	Total
Noise:					
Traffic	46	6	0	1	53
Domestic	14	8	0	0	22
Airport	12	1	0	0	13
Other	19	4	0	0	23
None	319				319
Total	410	19	0	1	430
Smells:					
Incinerator	34	1	2	0	37
Industrial	27	2	0	0	29
Other	15	7	2	0	24
None	340				340
Total	416	10	4	0	430
Smoke:					
Incinerator	102	14	2	1	119
Industrial	11	4	0	0	15
None	296				296
Total	409	18	2	1	430
Lack of privacy:					
From neighbours	12	3	15	0	30
From transient strangers	7	1	4	0	12
Other	6	2	2	2	12
None	376				376
Total	401	6	21	2	430

Cont'd....

TABLE 7.19 Continued

Type of problem	Action taken to counteract problems				
	None	Complain	Direct action	Withdraw from problem	Total
Trespass:					
By transient strangers	5	5	3	0	13
By children	3	8	0	0	11
Breaking and entering	3	3	0	0	6
None	400				400
Total	411	16	3	0	430
Insects:					
Several species	14	0	57	0	71
Insects that attack man	30	1	33	1	65
Insects that attack plants	6	0	24	0	30
None	264				264
Total	314	1	114	1	430
Animals:					
Dogs	43	14	20	0	77
Cats	28	0	3	0	31
Wild animals	8	0	1	0	9
None	313				313
Total	392	14	24	0	430

Cont'd....

TABLE 7.19 Continued

Type of problem	Action taken to counteract problems				
	None	Complain	Direct action	Withdraw from problem	Total
Other:					
Weeds	6	0	8	0	14
Matters concerning public welfare	5	1	1	0	7
Matters concerning transient strangers	6	0	1	0	7
Matters concerning industry or transportation	3	2	0	0	5
Matters concerning neighbours	1	1	1	0	3
None	394				394
Total	415	4	11	0	430

Source: Questionnaire (Question 54).

The Structure and Characteristics of Households

The final stage in the examination of the data is to describe relationships between the users of gardens and the observed differences in the ways in which gardens are used. In Chapter 6 garden "users" are described in terms of the individuals who participated in particular activities. In this section the "users" of gardens are the households -- usually nuclear families -- associated with the individual gardens. Household structure is described in terms of the size of households and the presence of children in households. The characteristics of households are described in terms of the occupation of the head of the household, the age of the head of the household, the place of birth of the head of

the household, and the household's nature of occupancy in its dwelling.[1] In cases where the household is described in terms of the circumstances of the head of the household the treatment of households as garden "users" assumes the behaviour of other members of households reflects or is influenced by the head, or that particular attributes of the head are indicators of the characteristics of the household. Thus the occupation of the head of the household is assumed to provide an indication of the socio-economic-status of the household, the age of the head to indicate the household's stage in life cycle, and the place of birth of the head to indicate the ethnicity of the entire household.

There are three basic approaches to the problem of describing households. The simplest and most suitable to small sample studies not directed towards the testing of hypotheses concerned with household characteristics is the approach employed in the present study where individual variables are used as general indicators of household characteristics. The second involves the creation of new variables -- composits of correlated variables -- which describe households in terms of complex characteristics that describe status, stage in life cycle, and other dimensions along which households vary. These classifications require measurement of large numbers of variables and a large number of cases and they have not yet been employed in studies of residential gardens. The third approach is to attempt to overcome the necessity of describing a large number of household types by sampling only households of predetermined types. The simplest variation of this approach is to assume that households in particular suburbs reflect the characteristics of those suburbs and sample only in suburbs of predetermined types.

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1. Data collected on annual household incomes are not used because data on a number of households are missing and because the data are apparently biased by individual respondents' lack of information or misinformation. See Table 3.07, p. 54.

This was the method used by Meyersohn and Jackson (1958) and Devine (1968) in their comparative studies of gardens in two Chicago and two Sydney suburbs. An elaborate attempt to hold even five or six basic household characteristics constant would present intractable sampling problems.

The Structure of Households

Table 7.20 shows the relationships between the number of persons in households and the frequencies of garden use for four types of recreation activity. Tables 7.21 to 7.23 show the relationships between the number of children in households and the number of hours a week gardens were in use for active recreation, the use of front and back gardens for recreation, and the keeping of animals.

The percentages of households using their gardens for all forms of recreation increased as the numbers of persons in the households increased. The percentages of households using their gardens for active recreation and the amount of time spent at active recreation both increased as the numbers of children in households increased. The percentages of households that kept pets increased as the numbers of children increased but the percentage of households keeping chickens decreased as the number of children in households increased.

TABLE 7.20

THE FREQUENCY OF GARDEN USE FOR SELECTED RECREATION ACTIVITIES BY THE SIZE OF HOUSEHOLD

Frequency of use for passive recreation	Size of household (percentage)		
	One person	Two people	Three or more people
More frequently than fortnightly	26	45	49
Fortnightly or less frequently	7	14	23
Never	67	41	28
Total	100	100	100
Chi-square test of original data significant at .001 level			
Frequency of use for social recreation - eating and barbequing			
More frequently than fortnightly	7	9	19
Fortnightly or less frequently	11	42	51
Never	82	49	30
Total	100	100	100
Chi-square test of original data significant at .001 level			
Frequency of use for social recreation - entertaining			
More frequently than fortnightly	15	11	16
Fortnightly or less frequently	15	46	50
Never	70	43	34
Total	100	100	100
Chi-square test of original data significant at .01 level			
Use for active recreation			
Active recreation	0	12	66
No active recreation	100	88	34
Total	100	100	100
	n = 27	n = 113	n = 290
Chi-square test of original data significant at .001 level			

Source: Questionnaire (Questions 16 and 18).

TABLE 7.21

NUMBER OF HOURS A WEEK GARDENS WERE IN USE FOR ACTIVE RECREATION BY NUMBER OF CHILDREN IN HOUSEHOLD

No. of hours of use/week for active recreation	No. of children under 15 years of age (percentage)			
	None	One	Two	Three or more
None	79	47	12	3
Less than 5 hours	14	17	15	7
6-15 hours	5	22	37	44
More than 15 hours	2	14	36	46
Total	100 n = 217	100 n = 72	100 n = 84	100 n = 57

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 15 and 26).

TABLE 7.22

THE USE OF FRONT AND BACK GARDENS FOR RECREATION ACTIVITIES BY NUMBER OF CHILDREN IN HOUSEHOLD

Use of front garden for recreation	No. of children under 15 years of age (percentage)			
	None	One	Two	Three or more
Use front	21	32	37	47
Do not use front	79	68	63	53
Total	100	100	100	100

Chi-square test of original data significant at .001 level

Use of back garden for recreation				
Use back	71	86	96	96
Do not use back	29	14	4	4
Total	100 n = 217	100 n = 72	100 n = 84	100 n = 57

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 15 and 34).

TABLE 7.23

THE KEEPING OF ANIMALS BY NUMBER OF CHILDREN IN HOUSEHOLD

Animals	No. of children under 15 years of age (percentage)			
	None	One	Two	Three or more
None	43	24	25	25
Pets only	49	65	68	72
Chickens (and pets)	8	11	7	3
Total	100 n = 217	100 n = 72	100 n = 84	100 n = 57

Chi-square test of original data significant at .01 level

Source: Questionnaire (Questions 10 and 15).

The Occupation of the Head of the Household

The occupations of the heads of the sampled households are grouped into five classes as follows:

Professional	3	medical practitioners or dentists
	13	teachers
	36	other professional, technical and related workers
Administrative	14	government administrative or managerial workers
	44	non-government administrative or managerial workers
Service	27	clerical workers
	29	sales workers
	15	services, sport or recreation workers
	4	armed services
Manual	2	farmers or farm workers
	26	transportation or communication workers
	6	clothes, textiles or leather goods workers
	28	toolmakers or machinists
	7	electricians
	20	metal workers
	16	carpenters or joiners
	7	bricklayers, painters or decorators
	9	food beverage or tobacco workers
	8	freight handlers
	32	labourers
Non-working	3	unemployed
	81	retired or on pension

The occupations of the heads of household are cross-tabulated with a number of aspects of garden use and design as follows:

Table 7.24 garden design types
7.25 the quality of maintenance
7.26 the cultivation of decorative vegetation
7.27 the cultivation of vegetables
7.28 the keeping of animals
7.29 the frequency of garden use for recreation activities
7.30 block size preferences.

In many of these tables the level of significance of the chi-square test results largely from the behaviour of households with heads in the professional and non-working groups. Comparatively large percentages of households with professional heads had plain gardens, often with relatively poor maintenance in the front garden and relatively good maintenance in the back garden. This group tended to extremes in cultivation of decorative vegetation. Relatively few households with professional heads grew vegetables or kept animals. The majority of households in this group used their gardens for passive, social, and active recreation but comparatively large percentages used their gardens fortnightly or less frequently for passive or social recreation. Respondents in households with professional heads tended to prefer large blocks.

Households with retired heads and heads not in employment tended to have elaborate gardens with good maintenance in front and back gardens and extensive decorative vegetation. Relatively few households in this group kept animals or used their gardens for any form of recreation. Respondents in this group tended to prefer dwellings with small gardens.

Households with heads in the administrative group were distinguished by the comparatively small percentage that kept chickens. Households in this group had a greater tendency to use their gardens for social

recreation than did households in other groups. A comparatively large percentage of respondents in this group stated preferences for large blocks.

Households with heads in the manual workers group tended to cultivate little decorative vegetation but a comparatively large percentage of households in this group kept animals. Households in this group made relatively little use of their gardens for passive and social recreation.

TABLE 7.24

GARDEN DESIGN TYPES BY THE OCCUPATION OF HEAD OF HOUSEHOLD

	Occupation of head (percentage)				
Garden design type	Prof.	Admin.	Services	Manual	Non-working
Plain throughout	40	33	48	36	24
Elaborate throughout	38	24	25	19	42
Plain front/elaborate back	10	33	18	36	28
Elaborate front/plain back	12	10	9	9	6
Total	100	100	100	100	100
	n = 48	n = 58	n = 73	n = 152	n = 74

Chi-square test of original data significant at .01 level

Source: Questionnaire (Question 73) and aerial photographs (with unclassified gardens excluded).

TABLE 7.25

THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS BY THE OCCUPATION OF THE HEAD OF HOUSEHOLD

Quality of maintenance of front garden	Occupation of head (percentage)				
	Prof.	Admin.	Services	Manual	Non-working
Poor	31	9	16	25	17
Moderately good	49	74	63	57	58
Good	20	17	21	18	25
Total	100	100	100	100	100
	n = 49	n = 58	n = 73	n = 157	n = 77

Chi-square test of original data significant at .01 level

Quality of maintenance of back garden					
Poor	41	23	36	42	39
Moderately good	41	67	49	45	46
Good	18	10	15	13	15
Total	100	100	100	100	100
	n = 49	n = 58	n = 73	n = 161	n = 80

Chi-square test of original data not significant (.20)

Source: Questionnaire (Question 73) and aerial photographs (with terrace houses excluded from first part of table).

TABLE 7.26

THE CULTIVATION OF DECORATIVE VEGETATION BY THE OCCUPATION OF THE HEAD OF HOUSEHOLD

Cultivation of decorative vegetation	Occupation of head (percentage)				
	Prof.	Admin.	Services	Manual	Non-working
None	14	10	11	14	6
Small displays	31	28	34	39	23
Intermediate-sized displays	26	48	41	39	46
Large displays	29	14	14	8	25
Total	100	100	100	100	100
	n = 49	n = 58	n = 73	n = 161	n = 80

Chi-square test of original data significant at .01 level

Source: Questionnaire (Question 73) and aerial photographs.

TABLE 7.27

THE CULTIVATION OF VEGETABLES BY THE OCCUPATION OF THE HEAD OF HOUSEHOLD

Cultivation of vegetables	Occupation of head (percentage)				
	Prof.	Admin.	Services	Manual	Non-working
Vegetables	33	47	48	43	48
No vegetables	67	53	52	57	52
Total	100	100	100	100	100
	n = 52	n = 58	n = 75	n = 161	n = 84

Chi-square test of original data not significant (.50)

Source: Questionnaire (Questions 8 and 73).

TABLE 7.28

THE KEEPING OF ANIMALS BY THE OCCUPATION OF THE HEAD OF HOUSEHOLD

	Occupation of head (percentage)				
Animals	Prof.	Admin.	Services	Manual	Non-working
None	44	31	30	23	54
Pets only	54	67	59	67	37
Chickens (and pets)	2	2	11	10	9
Total	100	100	100	100	100
	n = 52	n = 58	n = 75	n = 161	n = 84

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 10 and 73).

TABLE 7.29

THE FREQUENCY OF GARDEN USE FOR SELECTED RECREATION ACTIVITIES BY THE OCCUPATION OF THE HEAD OF HOUSEHOLD

Frequency of use for passive recreation	Occupation of head (percentage)				
	Prof.	Admin.	Services	Manual	Non-working
More frequently than fortnightly	38	55	51	46	44
Fortnightly or less frequently	33	23	25	17	10
Never	29	23	24	37	46
Total	100	100	100	100	100
Chi-square test of original data significant at .01 level					
Frequency of use for social recreation - eating and barbequing					
More frequently than fortnightly	13	19	16	18	11
Fortnightly or less frequently	54	64	49	44	28
Never	33	17	35	38	61
Total	100	100	100	100	100
Chi-square test of original data significant at .001 level					
Frequency of use for social recreation - entertaining					
More frequently than fortnightly	13	16	19	12	13
Fortnightly or less frequently	56	62	47	43	38
Never	31	22	35	45	49
Total	100	100	100	100	100
Chi-square test of original data significant at .05 level					

Cont'd....

TABLE 7.29 Continued

Use for active recreation	Occupation of head (percentage)				
	Prof.	Admin.	Services	Manual	Non-working
Active recreation	60	57	53	54	14
No active recreation	40	43	47	46	86
Total	100	100	100	100	100
	n = 52	n = 58	n = 75	n = 161	n = 84

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 18 and 73).

TABLE 7.30

BLOCK SIZE PREFERENCES BY THE OCCUPATION OF THE HEAD OF HOUSEHOLD

Preferred block size	Occupation of head (percentage)				
	Prof.	Admin.	Services	Manual	Non-working
Large block	44	40	24	34	20
Standard block	31	53	60	44	34
Small block	13	7	13	14	26
Court-yard	10	0	3	7	14
Flat	2	0	0	1	6
Total	100	100	100	100	100
	n = 52	n = 58	n = 75	n = 161	n = 84

Chi-square test of original data (excluding the data on flats) significant at .001 level

Source: Questionnaire (Questions 67 and 73).

The Age of the Head of Household

The ages of the heads of household are cross-tabulated with the following aspects of garden use and design:

Table 7.31 garden design types
7.32 the quality of maintenance of front and back gardens
7.33 the cultivation of decorative vegetation
7.34 the cultivation of vegetables
7.35 attitudes towards gardening
7.36 the frequency of garden use for recreation activities
7.37 block size preferences.

The elaborateness of gardens tended to increase with the ages of the heads of household. The percentages of households with well maintained front and back gardens also increased as age increased but a comparatively large percentage of the back gardens of households with heads in the 60 years and over group had poor maintenance. The percentages of households where the member of the household who did most of the gardening enjoyed gardening increased as the ages of the heads of household increased. The percentages of households that used their gardens for passive and social recreation increased as the age of the heads of household increased until the heads were approximately 50 years old and then decreased as the ages increased. The use of gardens for active recreation was related to the presence of children in households and this is reflected by the ages of the heads of household; the percentages of households using their gardens for active recreation decreased rapidly after the heads reached 40 years of age. The percentages of respondents stating preferences for small gardens increased as the ages of the heads of households increased.

TABLE 7.31

GARDEN DESIGN TYPES BY THE AGE OF HEAD OF HOUSEHOLD

Garden design type	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
Plain throughout	51	39	39	31	25
Elaborate throughout	12	18	27	29	44
Plain front/elaborate back	26	29	27	31	26
Elaborate front/plain back	11	14	7	9	5
Total	100	100	100	100	100
	n = 57	n = 79	n = 97	n = 84	n = 88

Chi-square test of original data significant at .01 level

Source: Questionnaire (Question 71) and aerial photographs (with unclassified gardens excluded).

TABLE 7.32

THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS BY THE AGE OF THE HEAD OF HOUSEHOLD

	Age of head (percentage)				
Quality of maintenance of front garden	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
Poor	40	27	19	11	14
Moderately good	50	54	60	68	62
Good	10	19	21	21	24
Total	100	100	100	100	100
	n = 58	n = 79	n = 101	n = 85	n = 91

Chi-square test of original data significant at .01 level

Quality of maintenance of back garden					
Poor	49	45	34	27	36
Moderately good	44	40	54	59	44
Good	7	15	12	14	20
Total	100	100	100	100	100
	n = 59	n = 80	n = 103	n = 85	n = 94

Chi-square test of original data significant at .05 level

Source: Questionnaire (Question 71) and aerial photographs (with terrace houses excluded from first part of table).

TABLE 7.33

THE CULTIVATION OF DECORATIVE VEGETATION

BY THE AGE OF THE HEAD OF HOUSEHOLD

Cultivation of decorative vegetation	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
None	29	11	12	6	5
Small displays	36	43	37	26	23
Intermediate-sized displays	27	36	39	54	43
Large displays	8	10	12	14	29
Total	100 n = 59	100 n = 80	100 n = 103	100 n = 85	100 n = 94

Chi-square test of original data significant at .001 level

Source: Questionnaire (Question 71) and aerial photographs.

TABLE 7.34

THE CULTIVATION OF VEGETABLES BY THE

AGE OF THE HEAD OF HOUSEHOLD

Cultivation of vegetables	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
Vegetables	36	38	39	55	50
No vegetables	64	62	61	45	50
Total	100 n = 59	100 n = 81	100 n = 104	100 n = 88	100 n = 98

Chi-square test of original data significant at .10 level

Source: Questionnaire (Questions 8 and 71).

TABLE 7.35

ATTITUDES TOWARDS GARDENING BY THE AGE OF THE HEAD OF HOUSEHOLD

Attitudes towards gardening	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
Unpleasant chore	12	13	12	8	9
Chore sometimes enjoyed	41	44	43	28	22
Recreation activity	33	37	33	50	56
Major hobby	14	6	12	14	13
Total	100	100	100	100	100
	n = 57	n = 79	n = 98	n = 86	n = 91

Chi-square test of original data significant at the .05 level

Source: Questionnaire (Questions 44 and 71) (with 19 non-respondents to Question 44 excluded).

TABLE 7.36

THE FREQUENCY OF GARDEN USE FOR SELECTED RECREATION ACTIVITIES BY THE AGE OF THE HEAD OF HOUSEHOLD

Frequency of use for passive recreation	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
More frequently than fortnightly	37	46	53	54	40
Fortnightly or less frequently	27	27	23	15	9
Never	36	27	24	31	51
Total	100	100	100	100	100
Chi-square test of original data significant at .001 level					
Frequency of use for social recreation - eating and barbequing					
More frequently than fortnightly	12	25	21	15	6
Fortnightly or less frequently	51	50	52	48	31
Never	37	25	27	37	63
Total	100	100	100	100	100
Chi-square test of original data significant at .001 level					
Frequency of use for social recreation - entertaining					
More frequently than fortnightly	12	18	18	10	11
Fortnightly or less frequently	42	51	53	50	37
Never	46	31	29	40	52
Total	100 n = 59	100 n = 81	100 n = 104	100 n = 88	100 n = 98
Chi-square test of original data significant at .05 level					

Cont'd....

TABLE 7.36 Continued

Use for active recreation	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
Active recreation	46	81	68	35	8
No active recreation	54	19	32	65	92
Total	100 n = 59	100 n = 81	100 n = 104	100 n = 88	100 n = 98

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 18 and 71).

TABLE 7.37

BLOCK SIZE PREFERENCES BY THE AGE OF THE HEAD OF HOUSEHOLD

Preferred block size	Age of head (percentage)				
	29 yrs. or less	30-39 years	40-49 years	50-59 years	60 yrs. or more
Large block	41	39	34	31	18
Standard block	49	46	51	42	35
Small block	8	9	9	19	28
Court-yard	2	4	6	7	14
Flat	0	2	0	1	5
Total	100 n = 59	100 n = 81	100 n = 104	100 n = 88	100 n = 98

Chi-square test of original data (excluding the data on flats) significant at .001 level

Source: Questionnaire (Questions 67 and 71).

The Place of Birth of the Head of Household

Although the numbers of households with heads born in countries other than Australia, the United Kingdom, and Italy are too small to permit tests of significance the place of birth of the head seems to have little effect on the use and design of gardens. The countries of birth of the heads of household are cross-tabulated in Tables 7.38 to 7.40 with the proportions of household fruit and vegetable requirements grown in gardens, the keeping of animals, and the use of front and back gardens for recreation. Italians and Greeks tended to grow more of their fruit and vegetable requirements than did other ethnic groups; the majority of Italian and Greek households grew more than six per cent of their requirements. Comparatively small percentages of households with Australian and United Kingdom-born heads kept animals and no households with heads born in the United Kingdom kept chickens. Comparatively few Italian households kept pets but one-third of the households in this group kept chickens. Differences in the percentages of households that used their front and back gardens for recreation were not significant although Table 7.40 shows that back gardens were used for recreation by a comparatively small percentage of Australian households and front gardens were used more by Italians than by other groups.

TABLE 7.38

THE PERCENTAGE OF FRUIT AND VEGETABLE REQUIREMENTS OBTAINED FROM GARDENS BY THE COUNTRY OF BIRTH OF THE HEAD OF HOUSEHOLD

Percentage of household requirements	Place of birth of head (percentage)						
	Aust.	U.K.	Italy	Greece	Germany	Neth.	Other
None	24	29	17	0	18	10	14
Less than 1%	16	21	10	23	9	20	14
1- 5%	30	26	17	15	37	60	31
6-25%	18	20	34	46	27	10	35
26-50%	7	1	14	8	0	0	3
51-75%	1	3	4	8	9	0	0
76-100%	4	0	4	0	0	0	3
Total	100 n = 272	100 n = 66	100 n = 29	100 n = 13	100 n = 11	100 n = 10	100 n = 29

Abbreviations: Aust. - Australia; U.K. - United Kingdom; Neth. - Netherlands; Other - includes all groups with fewer than 10 representatives.

Source: Questionnaire (Questions 53 and 72).

TABLE 7.39

THE KEEPING OF ANIMALS BY THE COUNTRY OF BIRTH OF THE HEAD OF HOUSEHOLD

Animals	Place of birth of head (percentage)						
	Aust.	U.K.	Italy	Greece	Germany	Neth.	Other
None	38	35	28	23	18	10	21
Pets only	55	65	38	69	82	90	65
Chickens (and pets)	7	0	34	8	0	0	14
Total	100 n = 272	100 n = 66	100 n = 29	100 n = 13	100 n = 11	100 n = 10	100 n = 29

Source: Questionnaire (Questions 10 and 72).

TABLE 7.40

THE USE OF FRONT AND BACK GARDENS FOR RECREATION

BY THE COUNTRY OF BIRTH OF THE HEAD OF HOUSEHOLD

	Place of birth of head (percentage)						
Use of front garden	Aust.	U.K.	Italy	Greece	Germany	Neth.	Other
Use front	29	32	41	23	9	0	34
Do not use front	71	68	59	77	91	100	66
Total	100	100	100	100	100	100	100
Chi-square test of original data not significant (.30)							
Use of back garden							
Use back	78	89	83	92	91	90	86
Do not use back	22	11	17	8	9	10	14
Total	100 n = 272	100 n = 66	100 n = 29	100 n = 13	100 n = 11	100 n = 10	100 n = 29
Chi-square test of original data not significant (.50)							

Source: Questionnaire (Questions 34 and 72).

The Nature of Occupancy

Aspects of garden use and design are cross-tabulated with the nature of occupancy as follows:

Table 7.41 the quality of maintenance of front and back gardens
7.42 the cultivation of decorative vegetation
7.43 the cultivation of vegetables
7.44 attitudes towards gardening
7.45 the development and alteration of gardens.

In general the effort put into gardening and the enjoyment obtained from gardening are both significantly less in rented gardens than in gardens in which households have equity. Table 7.01 shows that rented gardens

tended to be plain.[1] The tables in this section show that rented gardens tended to have poor maintenance and few flowers or vegetables. The gardeners in a relatively small percentage of renting households enjoy gardening. However renting households did make alterations to their gardens as Table 7.45 shows; three-quarters of the renters had either developed their gardens when their dwellings were new or changed their gardens during their period of occupancy.

TABLE 7.41
THE QUALITY OF MAINTENANCE OF FRONT AND BACK GARDENS BY THE NATURE OF OCCUPANCY

Quality of maintenance of front garden	Nature of occupancy (percentage)		
	Owned	Buying	Renting
Poor	11	22	40
Moderately good	63	59	53
Good	26	19	7
Total	100 n = 164	100 n = 192	100 n = 58
Chi-square test of original data significant at .001 level			
Quality of maintenance of back garden			
Poor	34	31	65
Moderately good	47	54	35
Good	19	15	0
Total	100 n = 166	100 n = 192	100 n = 63
Chi-square test of original data significant at .001 level			

Source: Questionnaire (Question 77) and aerial photographs (with terrace houses excluded from first part of table).

1. King (1972:98) may have been observing this relationship in his study of Yass, N.S.W., when he noted that the gardens of poor dwellings tended to have little greenery while the gardens of better dwellings generally had greenery.

TABLE 7.42

THE CULTIVATION OF DECORATIVE VEGETATION
BY THE NATURE OF OCCUPANCY

Cultivation of decorative vegetation	Nature of occupancy (percentage)		
	Owned	Buying	Renting
None	7	13	19
Small displays	29	33	41
Intermediate-sized displays	43	42	29
Large displays	21	12	11
Total	100 n = 166	100 n = 192	100 n = 63

Chi-square test of original data significant at .01 level

Source: Questionnaire (Question 77) and aerial photographs.

TABLE 7.43

THE CULTIVATION OF VEGETABLES BY THE NATURE OF OCCUPANCY

Cultivation of vegetables	Nature of occupancy (percentage)		
	Owned	Buying	Renting
Vegetables	58	36	30
No vegetables	42	64	70
Total	100 n = 172	100 n = 195	100 n = 63

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 8 and 77).

TABLE 7.44

ATTITUDES TOWARDS GARDENING BY THE NATURE OF OCCUPANCY

Attitude towards gardening	Nature of occupancy (percentage)		
	Owned	Buying	Renting
Unpleasant chore	9	11	14
Chore sometimes enjoyed	29	39	41
Recreation activity	49	37	41
Major hobby	13	13	5
Total	100 n = 165	100 n = 189	100 n = 57

Chi-square test of original data significant at .10 level

Source: Questionnaire (Questions 44 and 77) (with 19 non-respondents to Question 44 excluded).

TABLE 7.45

THE DEVELOPMENT AND ALTERATION OF GARDENS
BY THE NATURE OF OCCUPANCY

Development and alteration	Nature of occupancy (percentage)		
	Owned	Buying	Renting
Developed garden when dwelling was new	47	50	21
Changed garden during period of occupancy	46	36	54
Garden neither developed new nor altered during occupancy	7	14	25
Total	100 n = 172	100 n = 195	100 n = 63

Chi-square test of original data significant at .001 level

Source: Questionnaire (Questions 35, 36, and 77).

A Note on the "Minorities"

Having identified and commented on significant relationships between variables it is easy to forget the households and gardens that do not conform to "expected" patterns. Some of these "minorities" stand out in the analysis -- the 5 per cent of households that did no gardening and the 15 per cent that never used their gardens for recreation, for example -- but in the complex relationships between variables the "minorities" may be forgotten after the relationship has been recognized. Three examples will suffice to demonstrate the nature of these groups. Elaborate gardens and well maintained gardens were generally associated with large or standard-sized blocks and with gardens in which households had equity; however 19 per cent of the sampled households living in semi-detached dwellings, most of which were rented, had gardens with at least one elaborate venue and 10 per cent had good maintenance in their front gardens. Elements of garden design generally accumulate and gardens become more elaborate as they grow older; nevertheless 29 per cent of the gardens over twenty years old were entirely plain. Finally, most front gardens were open, or enclosed by low fences or walls; however 8 per cent of the front gardens in the sample were completely enclosed by tall fences or hedges.

Such gardens and households ensure variety in the suburban landscape and they may ultimately provide researchers with essential data on how individual households can adapt to particular residential situations.

PART III

DISCUSSION

CHAPTER 8

TOWARDS AN UNDERSTANDING OF THE RESIDENTIAL GARDEN

In the debate over the efficacy of the "quarter acre" block as a use of urban land a distinction is made between the form and the function of residential gardens. The form of gardens is discussed in the context of criticism of the aesthetic monotony of the residential landscape and the social conformity reflected by the monotonous elements of the landscape. Economic criticisms of the wastage of land alleged to occur in low density suburbs deal with the function of gardens, with the uses individual households make, or do not make, of their gardens. Even within the context of these separate criticisms the distinction between the form and the function of gardens is artificial, as the results of the cluster analysis in Chapter 4 show. Nevertheless the distinction is retained here in the separate discussion of the aesthetic and economic criticisms. The present chapter examines the place of the residential garden in the suburban landscape and describes the factors influencing or contributing to garden design. In Chapter 9 the uses of gardens are examined and the implications of reducing garden sizes discussed.

The residential garden is one of three major elements of the suburban landscape. The place of the garden in the landscape and its importance as an element of the landscape can be defined by a few simple observations about its relationships with the other two major elements, the public street and the private dwelling. The street is bounded by gardens and is the principal vantage point from which front gardens are viewed. The visual quality of the street is determined in part by the nature and quality of any public plantings and street furniture such as power poles and lamp standards lining it, and in part by the quality of the gardens and dwellings bounding it. Public plantings and street furniture are expressions of civic expediency and civic pride, often

controlled by committees, and always subject to the availability of community resources. The resources required to change the public elements of the landscape of a street or a series of streets and the need for community agreement before changes can be made, make the street a relatively inflexible element of the landscape. In many suburban areas a nature strip lies between the street and private gardens. Although they are lands in public ownership, part of the public right-of-way, nature strips are often maintained by individual householders. However the planting of trees and the installation of street furniture on nature strips is generally carried out by public authorities.

While streets are bounded by gardens, dwellings are surrounded by them. Access to the dwelling is through the garden and the garden contributes much to the visual impression of the dwelling, whether it is viewed from the street or from any other vantage point. The nature and quality of both the garden and the dwelling are controlled by the individual household, but, compared with the garden, the dwelling is relatively inflexible; it is usually much easier and less expensive to change the garden than it is to make more than superficial changes to the dwelling.

Because the residential garden is a visually important and relatively flexible element of the suburban landscape, understanding the garden is essential if the landscape is to be understood. Five sets of factors influence the design of residential gardens: the nature of residential blocks, relict elements of design, the personal tastes of householders, the resources and abilities of gardeners, and the uses made of gardens.

Five Factors Influencing the Design of Residential Gardens

The Nature of Residential Blocks

Although systematic discussion of the nature of residential blocks is limited here to data on the size of blocks, garden design is affected also by the shape of blocks and by their physical features such as slope, soils, and drainage. The shape of blocks may limit design opportunities or sometimes create design opportunities not normally available to most households. For example the opportunity to use the front garden for display can be radically affected by altering the shape of blocks. Battle-axe blocks, blocks isolated from the street save for a narrow access corridor, provide households with no opportunity for public display. On the other hand roughly triangular or diamond-shaped corner blocks with exceptionally long street frontages can provide households with opportunities for unusually extensive displays.

The slope,[1] drainage, and soils of blocks can have dramatic effects on garden design. A steeply sloping block may provide opportunities for unusual designs, at the same time inhibiting the installation of particular elements such as swimming pools. Good soils and drainage can encourage luxuriant growth in gardens and, of course, the opposite is true. Several residents of Port Adelaide, a peninsula north-west of Adealide, complained to interviewers that their gardening efforts consistently yielded discouraging results because the soil was sandy and saline.

The size of blocks, often determined by minimum block size

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1. Most of residential Adelaide is of low relief and the slope of blocks is not considered in the analysis. See Chapter 3, p. 40.

zoning,[1] limits the number of design elements that can be placed in gardens. As gardens become smaller the tendency to have entirely plain gardens or gardens with one plain venue increases[2] and the probability decreases that particular elements of design, such as adults' recreation facilities, will be included in gardens.[3] The quality of maintenance, which tends to improve as gardens become more elaborate,[4] is often better in large gardens than in small gardens.[5] The cultivation of vegetables is apparently less sensitive than other aspects of garden design to the size of gardens, but if the space in gardens is fully exploited for vegetable cultivation the quantity of produce that can be grown must be limited by the amount of space available.[6] In general, the design opportunities available to households decrease as the amount of space available in gardens is reduced.

Relict Elements of Design

Relict elements of design -- features remaining in gardens from the pre-residential landscape, from previous occupants, or from previous design epochs -- vary in design importance with the age and location of gardens. A garden newly established on flat pasture land such as the garden described at the beginning of Chapter 5 may have no relict features. A long established garden may consist entirely of relicts.

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1. See Chapter 1, pp. 4-5 and Chapter 2, p. 25.
2. Table 7.01, p. 130.
3. Table 7.02, p. 131.
4. Table 5.10, p. 99.
5. Table 7.05, p. 132.
6. Vegetables were not cultivated by the occupants of the sampled terrace houses. However vegetables were more often cultivated in the gardens of detached dwellings on small blocks than in the larger gardens of semi-detached dwellings. See Table 7.04, p. 132.

In most gardens the most important and inflexible relict is the dwelling itself, which, in its design and siting within the block determines the size and, to a considerable extent, the nature of the various venues within the garden. The siting and design of the dwelling is a function of the tastes of the builder and of the laws that govern residential development; the majority of householders (other than those who "build" their own houses) have little control over the first and none whatever over the second.

Households may have three basic attitudes towards relicts other than their dwellings. Some relicts such as large trees are valued elements of garden design. Others are unwanted and remain in gardens only as a result of the gardeners' inertia; children's play facilities are often left in gardens after they are outgrown, for example.[1] The third type of attitude is indifference; some relicts are neither valued nor unwanted. Many households, for example, are indifferent to their front or back boundary demarcations[2] although members of the household or previous occupants must have had a reason for choosing those particular styles of demarcation. Many relicts must be of this third type, simply remaining as new elements are added to garden designs. Few households do not change their gardens at some time,[3] but most changes involve the addition of new elements of design to gardens or the alteration or removal of existing elements.[4] Consequently gardens tend

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1. This is indicated by the fact that there was no significant relationship between the presence in gardens of children's play facilities and the proportions of their outdoor recreation time that children spent in their gardens. See Table 6.13, p. 124.

2. Tables 7.15 and 7.17, p. 143 and p. 144.

3. Table 7.45, p. 175.

4. Tables 5.14 and 5.15, p. 103 and p. 104.

to become more elaborate as their age increases:[1] garden design is generally cumulative.

Personal Taste

Gardeners are free to express their tastes, and perhaps their aspirations, within the constraints imposed by the nature of their blocks, by the relicts left to them, by the resources available to them, by legal controls, and by social pressures to conform to certain standards.[2] The individual householder operates as planner and as executor of his plans, following the dictates of his tastes. Individual tastes in particular design elements, in overall garden designs, and even in the desirable quality of maintenance vary enormously.[3] Tastes in garden design are seldom static, design elements are removed, altered and added as tastes change and as new ideas and resources become available. Vegetation grows and design elements accumulate as gardens become older. At the same time tastes in garden design, gardening interests, and the uses of gardens change as the circumstances of households change.[4]

Garden tastes can be as fanciful as those dictating the embellishment of gardens with concrete gnomes or they can reflect fundamental needs. Two such fundamental needs finding expression in garden design are the need for privacy and the need to express territoriality. A

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1. Table 7.10 p. 137.

2. Legal controls over the design and maintenance of gardens and social pressures to conform to design and maintenance standards are discussed in Chapter 7, pp. 145-147.

3. Design elements: Tables 5.01, 5.11 and 5.12, p. 80, p. 100, and p. 101; overall design: Table 5.02, p. 86, and Figures 5.1 to 5.4, pp. 87-90; and quality of maintenance: Tables 5.07 and 5.08, p. 96.

4. As the heads of household become older and family responsibilities change the recreational use of gardens decreases and gardening activity increases. See Tables 7.31 and 7.36, p. 164 and p. 168.

number of writers, including Rose (1961:26), Chermayeff and Alexander (1963:134), Middleton (1967:24), Keeble (1970:5.32), and Schenk (1972:176) have commented on the importance of privacy in the residential garden and several are critical of the lack of privacy in open front gardens. Households' needs for visual and acoustic privacy vary, of course, as do their means of achieving privacy. Decorative vegetation is sometimes used to screen dwellings or create secluded or shaded venues within gardens, but fences, walls, and hedges about property boundaries are the most important elements of design for the provision of privacy. Although most households prefer to have some form of boundary demarcation about their front gardens, aesthetics rather than the need for privacy often dictate the choice of a particular form of demarcation.[1] Privacy is a more important consideration in back gardens which are almost universally enclosed by 1.6 metre corrugated iron or wood paling fences[2] and often separated from the front garden by fences between the side boundaries and the dwelling.[3] It appears that most households in suburban Adelaide satisfy their needs for privacy by enclosing their back gardens and leaving their front gardens relatively open.

Dwellings and gardens are the home territories of households, and households exercise territorial control over their private domains by

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1. Tables 7.14 and 7.15, p. 142 and p. 143.

2. Tables 7.16 and 7.17, p. 143 and p. 144.

3. Table 5.01, p. 80.

4. Thirteen per cent of the respondents complained of lack of privacy in their gardens but fewer than 1 per cent used their gardens less than they otherwise would have because they lacked privacy. See Table 7.19, p. 148.

means of two basic mechanisms: personalization and defence.[1] The personalization of space involves marking it in an individual and distinctive way, and the fact that front gardens are often better maintained than back gardens[2] suggests that territorial expression through personalization may be an important function of front gardens. If the personalization of the front garden is to be an effective means of expressing territoriality households must have sufficient design flexibility to express their tastes and create venues that can be readily distinguished from the public domain and from neighbouring home territories.

Households defend their home territories by erecting barriers such as high fences or walls, by posting warnings such as "keep out" and "no trespassing" signs, and, in extreme cases, by threatening or waging physical battle. In a typical residential garden in Adelaide, territoriality is expressed by the erection of a reasonably effective physical barrier about the back garden and the personalization of the front garden which is usually enclosed only by a low fence or wall.

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1. In the lexicon of those who study human territoriality "home territory" does not always refer to the dwelling and its surrounds. Lyman and Scott (1967), for example, define home territory as a nominally public place, such as the "turf" of a teenage gang, which is occupied or controlled by an individual or a group. Porteous (1971) and Rappaport(1972b) discuss territoriality in the context of the dwelling and garden and Sommer (1969:42) suggests that the shape of an area has a significant affect on the ability of the inhabitant to defend it, "irregularity is likely to be accompanied by ambiguity and hence more frequent disputes over the ownership of particular segments [of space]." This may account, in part, for the regular, rectangular shape of almost all residential blocks although the convenience of the surveyor and servicing requirements cannot be discounted as factors.

2. Table 5.07, p. 96.

The Resources and Ability of the Gardener

The development and maintenance of gardens require resources of time and money and personal resources such as imagination, energy, patience, and practical skills (as horticulturalists, handymen, and labourers). The time members of households spend developing and maintaining gardens is highly variable,[1] and, although there is no significant relationship between the frequency of gardening and the elaborateness of gardens, it is apparent that well maintained gardens generally require weekly or more frequent care.[2] Low maintenance gardens consisting largely of indigenous vegetation are becoming increasingly popular, although few such gardens were observed in the sample. The capital and maintenance costs of gardens vary with garden design and labour input. One feature of the flexibility of gardens is that they permit considerable substitution of labour for capital, if a household is willing to invest sufficient labour it can maintain an elaborate garden well at relatively low cost.[3]

The time, money, and to a considerable extent, the personal resources gardeners are willing to invest in their gardens are determined in part by their attitudes towards gardening and their attitudes toward their gardens. It is necessary to make the distinction between these two types of attitudes because some gardeners are primarily interested in the results of their efforts while others are more interested in the activity

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1. Tables 5.03 to 5.05, pp. 93-95.

2. Tables 5.06 and 5.09, p. 95 and p. 98.

3. This is demonstrated by the tendency of households with non-working heads to have elaborate and well maintained gardens. See Tables 7.24 and 7.25, pp. 157-158. The only data on the costs of gardens presented in the study refer to the costs of changes carried out in a small sample of gardens. See Chapter 5, p. 105. Nineteeen per cent of the sampled households incurred costs by employing gardeners. See Chapter 5, p. 92, footnote 2.

of gardening than in the results they achieve. Although there is a tendency for those who enjoy gardening to spend more time at the activity than those who do not,[1] there are no significant relationships between the enjoyment derived from gardening and either the quality of maintenance of gardens[2] or the design of gardens.[3] It is apparent, therefore, that there are some gardeners who work for the final result and some who work -- not necessarily effectively or efficiently -- for the pleasure of the task.

The Use of Gardens

Although individual uses of gardens seldom affect overall garden design[4] many individual activities involve the installation of particular design elements. Household ancillary activities require laundry hoists, vehicle storage facilities, materials storage areas, animal enclosures, and outbuildings; the production of fruit and vegetables requires specialized planting; and the recreation activities of both adults and children may involve design elements such as patios, permanent garden furniture, swimming pools, and swing sets.[5]

Another perspective on the relationship between the use and design of gardens can be gained by considering as uses of gardens the activities

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1. Table 5.16, p. 107.

2. Table 5.17, p. 107.

3. Table 5.18, p. 108.

4. Occasionally garden designs are dominated by individual garden uses such as storage or extensive vegetable cultivation, however the effects of particular uses of gardens on garden design are generally restricted to discrete areas. There are no significant relationships, for example, between the use of gardens for recreation and garden design types. See Table 6.10, p. 122.

5. Household ancillary activities: Tables 5.10 and 5.19 to 5.21, p. 80 and pp. 108-109; the cultivation of fruit and vegetables: Table 5.12, p. 101; and recreation: Tables 6.11 to 6.13, pp. 123-124.

of planning and implementing garden designs and the pleasure obtained from the results. Many gardeners consider gardening a major hobby and most obtain enjoyment from the activity,[1] and many members of households, including those who do not enjoy gardening, must derive pleasure from their own garden designs and from the gardens of others.[2] These aesthetic uses of gardens are the ultimate determinants of many garden designs.

Garden Design and the Characterization of the Suburban Landscape as Monotonous

The criticism that the residential landscape is monotonous implies that all three elements of the landscape -- streets, dwellings, and gardens -- are uniform and unvarying. It is beyond the compass of this discussion to analyse the visual qualities of suburban streets or domestic architecture but it is clear that the criticism of monotony cannot be applied to garden design. For a landscape to be truly monotonous it would have to be comprised of uniform streets (the products more of civic expediency than of civic pride) and bounded by identical dwellings sited in identical gardens. Uniformity in garden design would require an almost complete coincidence of the five factors influencing garden design. Clustered either areally or according to some characteristics of status or household circumstances households would have to have patterns of behaviour so similar that their gardens were, or could become, indistinguishable. These households would have to occupy blocks of the same size and physical nature, enjoy the same absence or duplication of relict elements or design, and have identical tastes, abilities and resources, and patterns of garden use. It is

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1. See Chapter 5, p. 105.

2. In answering questions on the importance of front gardens and on the monotony of the suburban landscape several respondents to the follow-up interview volunteered the information that they enjoyed travelling through unfamiliar suburbs to look at the houses and gardens.

possible for a group of households with very similar tastes in garden design to occupy identical dwellings. It is highly improbable, however, that the coincidence would extend to gardeners' abilities and resources and to the uses made of gardens. Any tendency to conformity may be formalized by legal controls and social pressures which set minimum standards of design and maintenance, but these standards are surpassed by a majority of households and probably flouted by others as a means of distinguishing themselves from their neighbours.

The conclusion that a sustained coincidence of the factors influencing garden design is improbable is confirmed by the empirical data on garden design. The variety of design elements and individual designs observed in gardens, the differences in the qualities of garden maintenance, the apparent importance of display in front gardens, the dynamic quality of gardens, and the enjoyment most gardeners derive from gardening all indicate that the garden element of the residential landscape cannot be regarded as monotonous. While there were significant relationships between aspects of garden design and the characteristics of households,[1] there were always households that behaved differently from the "expected" patterns, ensuring that the garden element of the landscape did not become monotonous. For example, there was a tendency for households in rented dwellings to grow little decorative vegetation, but 11 per cent of the households in this group cultivated extensive displays of decorative vegetation.[2]

These observations do not sustain the contention that the form of suburban housing imposes constraints leading to conformity and monotony.

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1. Table 7.01, p. 130; Tables 7.24 to 7.26, pp. 157-159; Table 7.28, p. 160; Tables 7.31 to 7.34, pp. 164-166; and Tables 7.41 to 7.43, pp. 173-174.

2. Table 7.42, p. 174. See also Chapter 7, p. 176.

The gardens of suburban housing provide households with opportunities for personal expression and opportunities to contribute to the suburban landscape nowhere else available to them. These opportunities are widely exploited and the result is a landscape that is, in the diversity of its detail, far from monotonous.

CHAPTER 9

SOME IMPLICATIONS OF REDUCING THE SIZE OF RESIDENTIAL GARDENS

The debate over whether the use made of "quarter acre" blocks is sufficient to justify the continued widespread development of low density suburban housing involves four major questions. First, why should garden sizes be reduced? Briefly, the justification for reducing block sizes is seen by the proponents of medium-density development to lie in savings in land and servicing and development costs. It is argued that savings in land would serve to reduce urban sprawl while increasing the opportunity to develop semi-private or public open spaces. Second, how are gardens used? The use of gardens is described in Part II of this study and summarized in Table 9.01, but the answer to the fundamental question of whether "quarter acre" gardens should be preserved will depend on the interpretation of these data. The third question is an extension of the second: what are the implications for garden users of reducing garden space? The final question articulates the practical problem facing planners and decision makers: if desirable savings can be achieved and opportunities created by reducing gardens sizes, and if it is assumed (perhaps on a basis of an interpretation of the data presented in this study) that gardens are little used, how much housing with reduced garden space should be built, and for whom?

This chapter is primarily concerned with the second and third questions. In the following section two possible interpretations of the data are considered and the assumptions that gardens are little used and that the land is wasted are challenged. In the final section some implications of widespread reductions in garden space are considered.

TABLE 9.01

SUMMARY OF GARDEN USE

Activity	Percentage of households using garden (N = 430)	Average frequency of use	Average no. hours per week of use	Most common season of use
Recreation				
Passive	66	> 1/week	7	Summer
Active	49	> 1/week	11	All year
Social	58	> 1/week	4	Summer
Gardening				
All gardening activities	95	> 1/week	ND	All year
Watering	76	ND	4	ND
Lawns	90	ND	2	ND
Other tasks	86	ND	4	ND
Cultivation of decorative vegetation	87*	NA	NA	All year (A)
Cultivation of fruit and/or vegetables	78	NA	NA	Summer (A)

Cont'd....

TABLE 9.01 Continued

Activity	Percentage of households using garden (N = 430)	Average frequency of use	Average no. hours per week of use	Most common season of use
Household ancillary				
Drying laundry	99	> 1/week	ND	All year (A)
Vehicle maintenance	71	> 1/fortnight	ND	All year (A)
Keeping animals	66	ND	ND	All year (A)
Storage	35*	ND	ND	All year (A)

A Assumed
ND No data
NA Not appropriate
* N = 1040 (aerial photographs)

Source: Questionnaire and aerial photographs (tree obscurred gardens excluded). Summarized from Tables 5.03-5.05, 5.11 and 5.12, 5.19 and 5.20, 6.01 and 6.02, and 6.05.

A Perspective on the Use of Gardens

A categorical conclusion about the utility and value of residential gardens would require an aboslute measure of the efficiency or intensity of garden use which would permit a cost-benefit analysis of gardens or a comparison of garden use with alternate forms of land use. Such analyses have been undertaken for individual garden activities, for example Best and Ward (1956) compared the food production of gardens with that of agricultural land in England, but no single quantitative measure can be devised to describe all aspects of garden use. It is impossible to assign quantitative values to the aesthetic pleasure and psychological benefits derived from gardens. Even if it were decided to ignore these aspects of garden use and calculate a "garden use coefficient" based solely on the time spent at individual activities or some other measure of garden use there are no means of determining how individual activities should be weighted: is an hour of child's play of equal importance to an hour of work on a vegetable garden? Regardless of how activities are weighted there is no basis for assuming that the time (or energy) spent on individual activities should be treated additively to arrive at an overall assessment of garden use.

In the absence of any appropriate means of quantitative comparison of garden use with other types of land use a variety of qualitative interpretations of the data can be argued. For example it might be argued that the data show that gardens are not intensively used: the use of many gardens for most types of activity might be said to be infrequent, highly seasonal, and of short duration.[1] Such an interpret-

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1. The frequency, duration, and seasonality of gardening and recreation activities and the frequency of garden use for household ancillary activities are shown in Tables 5.03 to 5.05, pp. 93-95; Table 5.20, p. 109; Tables 6.01 and 6.02, pp. 114 and 116; and Table 6.05, p. 118. These data are summarized in Table 9.01.

ation would lead easily to the conclusion that gardens are unimportant and that garden sizes can be substantially reduced without much altering household activity patterns.

However it is argued here that the importance of residential gardens is demonstrated by the numbers of households using their gardens for a variety of activities. As the summary in Table 9.01 shows, one or more members of the majority of households use their gardens for most of the purposes considered in the study. The opportunities accruing to households from the design-flexibility of gardens[1] are matched by opportunities accruing from use-flexibility: the number of gardening and household ancillary activities for which gardens are used far exceeds the number of such activities for which households can use any other outdoor venue. Gardens are also flexible venues for recreation activities; apart from being used by more households than any other outdoor facility gardens are used for two or more recreation activities by a larger percentage of their users than any other outdoor facility.[2]

Added to this is the observation of an apparently high level of satisfaction with the suburban form of development and with "quarter acre" gardens. The majority of households living in standard or large suburban blocks prefer this form of development,[3] the majority use their gardens for a variety of purposes, and few find external problems interfere with their use of their gardens.[4]

Recognition of apparent satisfaction with the *status quo* should not be extended automatically into an argument against (or for) changing

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1. See Chapter 8, pp. 182-184.
2. Table 6.14, p. 125.
3. Tables 7.11 and 7.12, pp. 139-140.
4. Table 7.19, pp. 148-150.

the *status quo*. In most cases preferences for existing forms are expressed in the absence of any real knowledge of, or experience with, alternate forms of housing and it is possible new forms of housing can be designed which will give their inhabitants equal or better opportunities and the same or higher levels of satisfaction. However the observations of the wide use of gardens for a variety of purposes and the apparent satisfaction of residents of Suburbia with their "quarter acre" gardens do not sustain the medium-density proponents' criticisms of the suburban form of development: residential gardens are seldom the wasted land that some critics assume.

The Use of Gardens and the "New" Forms of Housing

The Nature of the Change

Having shown that residential gardens are widely used for a variety of purposes it is necessary to consider the implications of reducing the amount of garden space available to households by building "new" medium-density forms of housing. Obviously the impact of medium-density development on the social and physical environments of the city will depend on the extent of medium-density development and on the role it plays in the housing market. There are three basic groups of homeseekers: an upper income group able to afford any housing on the market; a middle income group able to purchase only dwellings of the types and standards currently common on the market; and a low income group restricted to low cost (often public) housing. If a situation were to arise where medium-density dwellings dominated the new housing market in the way low density housing has dominated markets during recent decades the middle and lower income groups would be most affected. The purchasing power of the upper income group would assure households in this group access to the housing types they preferred. The limited purchasing power of the middle and

lower income groups would bias their choices towards the increasingly common medium-density housing just as they have been biased towards low density housing in the past. This situation would little affect households preferring housing with small gardens, especially households with older heads and those who do not make extensive use of their gardens.[1] But the majority of households, presumably still conditioned by experience to prefer standard-sized or large gardens, would have to adapt to garden spaces smaller than they had anticipated or felt they needed.

Medium-density forms of housing in Adelaide typically provide households with up to one-third of the private open space normally available in "quarter acre" blocks.[2] The following discussion of the implications of widespread reductions in garden space assumes reductions of this order but of course less severe reductions are possible. It is probable that the problems of adaptation to small blocks would be fewer the closer block sizes were to the traditional "quarter acre" size; however there is no reason to assume either that the acceptability of gardens is a smooth function of their size or that there are thresholds of acceptability. Research into the ways in which households adapt to a range of garden sizes will be necessary to resolve this problem. Such research would require very fine measurement and because of the difficulties inherent in attempts to assess the utility of gardens it is possible that the problem will not be resolved without some form of controlled experimentation with block sizes.

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1. Table 7.13, p. 140; Table 7.30, p. 162, and Table 7.37, p. 169.

2. Three forms of medium-density housing in Adelaide are described in Chapter 2, pp. 31-39.

The Implications of the Change

If forced by the structure of the housing market to adapt to small medium-density gardens individual households might react in three basic ways. They might pursue normal garden activities, treating small gardens or court-yards as microcosms of standard residential gardens. This means of adaptation would be suitable for some activities and easy for households unable or disinclined to use standard-sized gardens. Second, households might seek alternate venues for activities that could have been carried out in standard-sized gardens. Finally households might abandon activities, perhaps substituting other activities for those abandoned. An impression of the possible impact of widespread medium-density development on individual households and on the community can be gained by considering how these methods of adapting to small gardens are likely to be applied to individual activities for which standard-sized gardens are widely used.

Gardening. In Adelaide and other Australian cities where there are no alternate venues for gardening households with medium-density gardens would be obliged to either condense all of their gardening activities into small spaces or abandon some of their gardening activities. In medium-density developments where private open space is limited to private court-yards gardening for public display would have to be abandoned. Some gardeners might adopt intensive styles of decorative gardening after oriental patterns and many gardeners might continue to cultivate vegetables, although the scale of vegetable production must vary with the space available.[1] It seems likely, however, that for members of many households the time spent gardening -- an activity at least sometimes enjoyed by one or more members of the majority of households[2] -- would be absolutely

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1. Table 7.04, p. 132.
2. See Chapter 6, p. 105.

reduced.[1] If the time spent gardening is reduced many individuals will undertake various forms of recreation activity as a substitute for gardening, either indoor activities such as watching television or relatively sedentary hobbies, outdoor activities in the garden, or activities involving semi-private, public or commercial recreation facilities.

Household Ancillary Activities. Some forms of household ancillary activity such as drying laundry and the keeping of pets[2] are not likely to be affected by reductions in garden space. However other activities which require privacy and space for extended periods such as the rebuilding of old automobiles and potentially obtrusive activities such as the keeping of chickens and the burning of rubbish are likely to be abandoned by households with small gardens. Small gardens or court-yards provide adequate space for such activities -- activities often relegated to the "bottom" of standard-sized gardens -- but in the limited space available in small gardens they would tend to be sufficiently obtrusive to limit garden use for most other activities. This is probably why small gardens in the sample were seldom used for the keeping of chickens[3] or for vehicle maintenance.[4]

There are no suitable alternate venues for many of the household ancillary activities that households with small gardens might abandon.

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1. Although a causal relationship cannot be assumed, Tables 7.03 to 7.05, pp. 131-132, show that relatively few gardeners with semi-detached and terrace-sized gardens worked on their gardens more frequently than weekly and that the percentages of gardens with vegetables and moderately well or well maintained gardens both decreased as block sizes decreased.

2. Table 7.07, p. 134.

3. *Ibid.*

4. Table 7.06, p. 134.

Most household ancillary activities supplement household economies in some way and many, such as the rebuilding of automobiles, must often be regarded as recreation activities. If household ancillary activities are essential, and if there are no suitable or convenient alternate venues, they would have to be replaced by community services such as increased rubbish collection or by commercial enterprises such as automotive services. Apart from potentially reducing households' self reliance a reduction in garden space might result in increases in individuals' recreation time or changes in individuals' recreation activities by reducing the time spent on household ancillary activities.

Recreation. By reducing opportunities for gardening and for the use of gardens for household ancillary activities medium-density housing is likely to increase demand for recreation facilities. The data suggest that reductions in garden sizes would have little effect on the use of gardens for passive recreation and active recreation (presumably other than activities such as ball games which require relatively large areas) but it is possible that small gardens would be used less than standard-sized gardens for social recreation.[1] Individuals might adapt to reductions in the opportunities to garden and undertake household ancillary activities by substituting passive and active recreation in the garden for these activities but widespread reductions in garden space would probably increase demand for public facilities and for alternate private facilities such as vacation homes. The planners of many medium-density developments recognize this and provide semi-private facilities such as common open space and hobby areas as adjuncts to medium-density housing.[2]

The residential garden is the lowest ranking element in the

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1. Table 7.09, p. 136.

2. See Chapter 2, pp. 31-39.

heirarchy of outdoor recreation spaces. The majority of adults and children spend at least half of their outdoor recreation time in their gardens,[1] the back garden is used for recreation by more households than any other outdoor facility,[2] and it is used for recreation by most of the households using other facilities.[3] Any change in the lowest ranking element of the heirarchy is likely to change the patterns of use of the other elements: local parks, ovals, beaches, rural parks, and the facilities provided by private clubs and commercial enterprises. The demand for, and use of, these facilities is likely to increase if block sizes are decreased and communities will be expected to provide facilities to meet increased demand. Individuals living in medium-density housing are likely to have more recreation time, to travel more and spend more for outdoor recreation, and, perhaps, to spend smaller proportions of their recreation time outdoors.

Conclusions

Medium-density housing is promoted and built as a means of conserving urban land, reducing servicing costs in new residential development, and creating a residential landscape over which the planner has almost absolute aesthetic control. Underlying the concept of medium-density housing is the critical assumption that the residential gardens of traditional low density suburban housing are unused and unnecessary. The analysis of the use and design of these low density gardens in Adelaide does not sustain this assumption. A widespread reduction in private garden space would result in a reduction of individual contributions to the residential landscape; the responsibility

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1. Tables 6.06 and 6.07, pp. 118-119.
2. Table 6.14, p. 125.
3. See Chapter 6, p. 126.

for relieving the monotony of a landscape consisting of a great many similar dwelling units would be shifted from the householder to the planner and architect. The number of uses which can be made of gardens would be reduced, resulting in either a more sedentary population or an increased demand for public and commercial recreation facilities. Individuals would either spend less recreation time outdoors or more time and money travelling to outdoor recreation facilities.

It would be foolish to condemn medium-density housing simply because it would alter the familiar suburban landscape or change the activity patterns of suburban dwellers. However it would be unfortunate if changing economic circumstances and architectural tastes resulted in widespread alterations to the size and nature of gardens before the ramifications of these changes were understood.

APPENDIX

THE QUESTIONNAIRE AND FOLLOW-UP INTERVIEW

APPENDIX

The following are reproduced below:

1. The questionnaire schedule, pp. 203-216.
2. Page 11 of the answer booklet, p. 217.
3. The notes and instructions for interviewers, pp. 218-223.
4. A list of the basic questions asked in the follow-up interview, p. 224.

The Questionnaire Schedule

The questionnaire was designed for an administration time of between twenty and thirty minutes and interviewers reported many interviews of this length. Their garden is a subject of considerable interest to many people, however, and all interviewers found there was a tendency for respondents to prolong the interview. Interviewers were encouraged to try to complete the schedule before the conversation was allowed to wander.

To facilitate binding columns for the recording of coded data are not reproduced and the pagination of the schedule as it is reproduced differs slightly from that of the printed schedule.

The questionnaire schedule was accompanied by an answer booklet of thirteen pages which was handed to the respondent at the beginning of the interview. Some pages of the answer booklet acted as prompts to the respondents and others presented respondents with a list of alternate answers to particular questions. With the exception of the alternate answers for Question 67 (Page 11 of the answer booklet) the choices set out in the booklet differed in no way from those set out in the schedule. Only Page 11 of the booklet is reproduced in the Appendix.

THE AUSTRALIAN NATIONAL UNIVERSITY

Residential Land Use Survey

A. Interview Information

This section is to be completed before contact is made at the assigned house. If no contact is made retain the questionnaire for call-backs. It is essential that the identification number and address correspond with those given on the assignment sheet.

1. Identification number ___ ___ ___ ___

2. Street address _____

3. Suburb _____

4. Type of house:
   1. Free-standing house on a large block ___
   2. Free-standing house on a standard (medium-size) block (6,000-7,000 sq. ft.) ___
   3. Free-standing house on a small block ___
   4. Duplex (sharing wall with another dwelling) ___
   5. Terrace house ___

5. Interviewer _____

6. Dates of calls to house (last indicates date of interview)

   ___/ ___ ___/ ___

   ___/ ___ ___/ ___

7. Time of Interview _____

****

After making contact:

1. *Identify yourself.*
2. *Explain the purpose of the survey.*
3. *Explain that the respondent's answers will be regarded as strictly confidential.*
4. *Explain that the interview will take between twenty minutes and one-half hour.*
5. *Ask if the respondent or some member of the household is willing to participate.*

No interview granted (check here) ___

Reason (if given) for not agreeing to interview _____

_____

****

B. Description of Garden and household

I would like to begin by asking you a few questions about your house and garden and about the size of your household. Throughout the interview when I mention your garden I am referring to all of the open land in your block.

In a number of questions during the interview I will be asking you to choose one of several possible answers which are printed in this booklet. Please do not turn the page to a new set of answers until I ask you to.

8. Would you please turn to page 1 of the booklet and tell me which of the listed items occur in your garden.

Check items as mentioned and leave those that do not occur in the garden blank.

1. Flower beds ___
2. Vegetable beds ___
3. Swing sets or sand pits ___
4. Animal pen or house ___
5. Verandah, deck, patio or court yard ___
6. Barbeque ___
7. Swimming pool ___
8. Fruit trees ___
9. Septic tank or sewage collection tank ___
10. Garage or car-port ___
11. Outhouses other than garages (number) ___
12. Stored boats, caravans, old cars (number) ___

9. Do you have a clothes hoist or line?

an incinerator? ___
an electric or petrol lawn mower? ___

10. Have you a dog ___, a cat ___, or any other animals ___?
(Other animals: _____)

11. How many bedrooms has your house? _____

12. How long have you lived in this house? _____ years

13. What is the approximate age of this house? _____ years

14. Are there any children living at home?

Yes No

If "no" go to question 16.

15. Would you tell me their ages please.

Place number of children in each age group next to group listing.

0-5 years ___ 6-10 ___ 11-15 ___ over 15 ___

16. How many people live in this house? _____

17. *It is not necessary to ask this question if answer is already known from previous questions, simply check appropriate category and continue.*

What is your relationship to the household?

1. Head of household - male ___
2. Head of household - female ___
3. Wife of head of household ___
4. Son or daughter of head of household ___
5. Several members of household ___
6. Other (specify) _____

****

C. Use of garden

Now I would like to ask a group of questions about how the members of your household use your garden and how they spend their recreation time.

18. On page 2 of the answer booklet are seven possible answers to the question "When the weather is suitable how often do you and other members of your family use your garden for drying clothes?" I will read you a list of activities for which you and your family might use your garden; would you please choose one of the frequencies from page 2 for each activity.

Frequencies as shown in booklet:
1. Daily
2. More than once per week
3. Once per week
4. Once per fortnight
5. Once per month
6. Less than once per month
7. Never

Activities

Read this list to respondent and place number of frequency next to each activity.

A. Drying clothes ___
B. Working on the garden ___
C. Playing games or sport ___
D. Eating or barbequing ___
E. Giving a baby fresh air ___
F. Entertaining friends ___
G. Talking to neighbours ___
H. Working on or washing a car or boat ___
I. Reading, sun-baking, sitting out or sleeping ___
J. Working on a hobby other than gardening, a car or a boat ___
K. Can you think of any other activity for which you or any other member of your family uses your garden?
(Specify) _____

(Frequency) ___

The next group of questions deal with your recreation time. When I mention recreation time I am referring to time that is not spent working, doing chores, eating or sleeping.

19. Please turn to page 3.
Thinking of the year as a whole would you please compare the amount of recreation time that the adults in your household spend indoors with the amount that they spend outdoors in all locations. Please select one of the possible answers on page 3.

The adults in your household spend

1. Almost none of their recreation time outdoors ___
2. Less than half of their recreation time outdoors ___
3. About half of their recreation time outdoors ___
4. More than half of their recreation time outdoors ___
5. Nearly all of their recreation time outdoors ___

20. Please turn to page 4.
Now please compare the amount of outdoor recreation time that the adults in your household spend in their own garden with the amount that they spend in locations away from home. Please select one of the possible answers from page 4.

The adults in your household spend

1. Almost none of their outdoor recreation time in the garden ___
2. Less than half in the garden ___
3. About half in the garden ___
4. More than half in the garden ___
5. Nearly all of their outdoor recreation time in the garden ___

If there are no children in the family go to question 23.

21. Please turn to page 5 of the booklet.
Thinking of the year as a whole would you please compare the amount of recreation time that your children spend outdoors with the amount that they spend indoors in all locations. Please select one of the possible answers on page 5.

Your children spend

1. Almost none of their recreation time outdoors ___
2. Less than half of their recreation time outdoors ___
3. About half of their recreation time outdoors ___
4. More than half of their recreation time outdoors ___
5. Nearly all of their recreation time outdoors ___

22. Please turn to page 6.
Please compare the amount of outdoor recreation time that your children spend in their own garden with the

amount that they spend in locations away from home. Please select one of the possible answers from page 6.

Your children spend

1. Almost none of their outdoor recreation time in the garden ___
2. Less than half in the garden ___
3. About half in the garden ___
4. More than half in the garden ___
5. Nearly all of their recreation time in the garden ___.

23. Is your garden used by any members of your household for playing games or sport or working on a hobby other than gardening?

Yes No

If "no" go to question 27.

24. Which member or members of your household use the garden most for these activities?

_____

25. At what time of year is your garden used for playing games or sport or working on a hobby other than gardening?

_____

26. Please turn to page 7.
During that time of year approximately how many hours per week is your garden in use for playing games or sport or working on a hobby other than gardening? Please select one of the possible answers from page 7 of the answer booklet.

1. Less than 1 hour ___
2. 1-5 hours ___
3. 6-10 hours ___
4. 11-15 hours ___
5. 16-20 hours ___
6. More than 20 hours ___

27. Is your garden - including deck, patio, court-yard or verandah areas - used by members of your household for entertaining friends, eating or barbequing?

Yes No

If "no" go to question 30.

28. At what time of year is your garden used for entertaining friends, eating or barbequing?

_____

29. During that time of year approximately how many hours per week is your garden in use for entertaining friends, eating and barbequing? Please choose one of the possible answers from page 7.

1. Less than 1 hour ___
2. 1-5 hours ___
3. 6-10 hours ___
4. 11-15 hours ___
5. 16-20 hours ___
6. More than 20 hours ___

30. Is your garden used by any members of your household for reading, sun-baking, sitting out or sleeping?

Yes No

If "no" go to question 34.

31. Which member or members of your household use the garden most for reading, sun-baking, sitting out or sleeping?

_____

32. At what time of year is your garden used for reading sun-baking, sitting out or sleeping?

_____

33. During that time of year approximately how many hours per week is your garden in use for reading, sun-baking, sitting out and sleeping? Please choose one of the possible answers from page 7 of the answer booklet.

1. Less than 1 hour ___
2. 1-5 hours ___
3. 6-10 hours ___
4. 11-15 hours ___
5. 16-20 hours ___
6. More than 20 hours ___

34. On page 8 of the answer booklet is a list of places where the members of your household might spend outdoor recreation time. I will read you a list of activities, will you please tell me in which of the listed locations members of your household do each of the activities.

Read each of the activities and ask in which of the listed locations the members of the family do that activity. Circle the appropriate activity numbers for each location.

Activities - 1. Reading, sun-baking, sitting out or sleeping.
2. Playing games or sport.
3. Eating, barbequing or entertaining friends.

Locations	Activities
A. In your back garden	1 2 3
B. In your front garden	1 2 3
C. In neighbours' gardens or in the street	1 2 3
D. In a public park near your home	1 2 3
E. At a public beach	1 2 3
F. In a park outside the city	1 2 3
G. At a private club	1 2 3

****

Interviewer - disregard this entry

Identification

Card 2

****

D. Gardening Activities

Now we have a group of questions about your family's gardening activities.

35. Did your family develop this garden when this house was new?

Yes No

If "yes" go to question 37.

36. Have you changed the garden since you moved into this house?

Yes No

37. Have you bought or borrowed or been given any gardening books or magazines during the last year?

Yes No

38. Do you have plans to change your garden next year?

Yes No

If "no" go to question 40.

39. Would you please describe briefly the changes that you plan to make.

_____

_____

40. Is your garden any different now than it was at this time last year?

Yes No Cannot answer

If "no" or "cannot answer" go to question 42.

41. Would you please describe briefly the changes that you have made.

_____

_____

42. Which member or members of your household do most of the gardening?

_____

If "nobody" or "an employed gardener" go to question 45.

Questions 43 and 44 refer to the person or persons named in answer to question 42.

43. Did his/her/your parents have an attractive garden?

Yes No

44. Please turn to page 9 of the answer booklet.
Which of the statements on page 9 best describes his/her/your feelings about gardening?

1. It is a necessary and unpleasant chore ___
2. It is a chore that he/she/you sometimes enjoy(s) ___
3. It is a pleasant recreation activity ___
4. It is a major hobby ___

45. At what time of the year is most of your gardening done?

_____

46. During the busiest time of year in the garden, how many hours per week are spent cutting and trimming lawns?

_____ hours

47. During the busiest time of year in the garden how many hours per week are spent hand watering?

_____ hours

48. During the busiest time of year in the garden how many hours per week are spent on other tasks such as caring for flowers, vegetables, trees and shrubs?

_____ hours

49. Is most of your gardening done on weekdays ___, at weekends ___, or throughout the week ___?

50. Have you ever employed anyone to help in your garden?

Yes No

If "no" go to question 52.

51. Please describe briefly how often you employ help and the type of work that you have done in your garden.

_____

_____

52. Do you grow vegetables or fruit?

Yes No

If "no" go to Section E.

53. Would you please estimate the percentage of your household's annual fruit and vegetable requirements that you supply from your own garden. Would you say that you produce less than 1%, 1-5%, 6-10% or more of your household fruit and vegetables in your own garden?

_____

****

E. Problems and Attitudes

Now we have a group of questions that deal with problems that you might have encountered in the use of your garden and with your feelings about the size and design of home gardens.

54. Please turn to page 10 of the answer booklet. On page 10 are a list of things which may have troubled you or other members of your household when you have been using your garden. Please go through the list and tell me whether any of these things have troubled you, and, if they have, please tell me what action you or other members of your family have taken to correct the situation.

Note source of problem on line marked "Source" and corrective action on line marked "Action". If no action was taken write "none".

1. Noise - Source: _____

Action: _____

2. Smells - Source: _____

Action: _____

3. Smoke - Source: _____

Action: _____

4. Lack of privacy - Source: _____

Action: _____

5. Insect Pests - Source: _____

Action: _____

6. Trespass - Source: _____

Action: _____

7. Animals - Source: _____

Action: _____

8. Other (Specify) - Source: _____

Action: _____

55. Are any of these problems so serious that they keep you out of your garden?

Yes No

If "no" go to question 57.

56. Which of these problems keep you out of the garden?

_____

57. Is the use that you make of your garden in any way affected by any state or local government laws or regulations?

Yes No

If "no" go to question 59.

58. Would you please describe briefly the laws or regulations that affect you.

_____

_____

59. Has your family ever changed houses primarily because it wanted a different type of garden?

Yes No

If "no" go to question 61.

60. Would you please tell me what features you were looking for in the new garden.

_____

_____

61. What type of fence, wall or hedge do you have around your front garden?

Material: _____

Height: _____ feet

62. What type of fence, wall or hedge would you and your family prefer to have around your front garden?

Material: _____

Height: _____ feet

63. Would you please tell me why that type of enclosure would be preferred?

_____

_____

64. What type of fence, wall or hedge do you have around your back garden?

Material: _____

Height: _____ feet

65. What type of fence, wall or hedge would you and your family prefer to have around your back garden?

Material: _____

Height: _____ feet

66. Would you please tell me why that type of enclosure would be preferred?

_____

_____

67. Please turn to page 11 of the answer booklet.
In terms of garden space which of the block sizes shown on page 11 of the answer booklet would you and your family prefer?

1. A self-contained flat with no private garden space ___
2. A town-house or court-yard with a limited garden area ___
3. A free standing house on a small block ___
4. A free-standing house on a mdedium-size block ___

5. A free-standing house on a large block ___
6. Other (specify) _____

68. Would you please tell me why you made that choice.

_____

_____

69. Please turn to page 12.
If a new family moved into your street and failed to take care of their garden, allowing it to collect rubbish and become overgrown, which of the actions on page 12 would you most likely take?

1. Offer to give them a hand with it ___
2. Do nothing ____
3. Suggest to them that they clean it up ___
4. Tell them that if they do not clean it up you will take some action ___
5. Complain to the local government or some other authority ___
6. Other (specify) _____

****

F. Background

Finally, I would like to ask a few more questions about your household. This information is important to the study because it allows us to make comparisons between the ways in which different types of households use their gardens.

70. How many cars, station sedans, and utilities do you and your family regularly drive for private purposes?

_____

71. Please turn to page 13.
In which of the listed age categories is the head of the household?

1. 24 or less ___	5. 40-44 ___	8. 55-59 ___
2. 25-29 ___	6. 45-49 ___	9. 60-64 ___
3. 30-34 ___	7. 50-54 ___	10. 60 or over ___
4. 35-39 ___		

72. In what country was the head of the household born?

_____

73. What is the occupation of the head of the household?

_____

74. In which suburb of the city is the head of the household's place of work?

_____

75. How many members of the family presently contribute directly to the household income?

_____

76. Please turn to page 14.
Which of the categories listed on page 14 best approximates your total household income per annum before taxes and other deductions?

1. Less than $2,000 ___
2. 2,000-3,999 ___
3. 4,000-5,999 ___
4. 6,000-7,999 ___
5. 8,000-9,999 ___
6. 10,000-14,999 ___
7. 15,000-19,999 ___
8. 20,000 or more ___

77. Do you own this house outright ___, are you buying

it ___, or are you renting it ___?

78. How many times has your family moved in the last 10 years or since marriage, which ever period is shorter?

_____

79. Where was your residence before you came to this house?

Suburb and state if in Australia, city and country if overseas.

_____

80. What type of dwelling was your last residence before you came to this house?

1. Detached house ___
2. Town house, courtyard house or duplex ___
3. Flat ___
4. Other (specify) _____

****

Thank you for your co-operation and assistance. I would like to assure you again that all of this information will remain strictly confidential.

DO NOT FORGET TO TAKE THE ANSWER BOOKLET WHEN YOU LEAVE THE HOUSE

****

G. *Post Interview Notes*

1. What were your impressions of the garden? Was it neat? Was it elaborate?

2. *What were your impressions of the respondent's attitude towards gardens?*

3. *Was there anything unusual about the family or the structure of the household?*

4. *Did the respondent have difficulty in answering any of the questions?*

5. *Was there anything noteworthy about the interview? Did it take longer than usual? Did the respondent become bored or nervous?*

NOTES

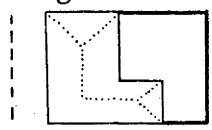
Please check here if you have used the back of any page(s) for notes. ___

Answer Booklet

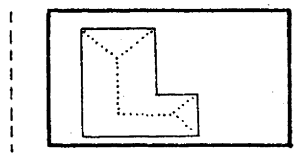
Page 11

1. A self-contained flat with no private garden space

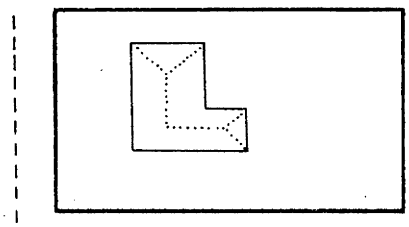
2. A town-house or court-yard house with a limited garden area



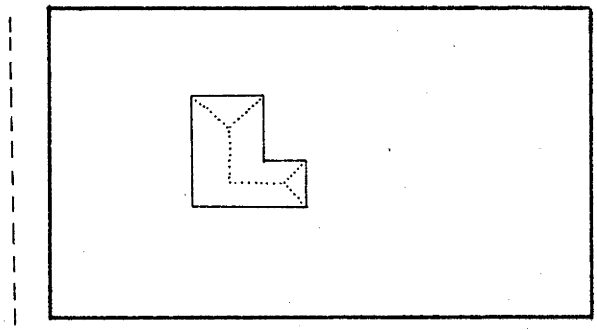
3. A free-standing house on a small block



4. A free-standing house on a medium-sized block



5. A free-standing house on a large block



6. Other - Please specify

THE AUSTRALIAN NATIONAL UNIVERSITY

Residential Land Use Survey

Notes and Instructions for Interviewers

The residential land use survey questionnaire which you will be administering is part of a study of the use and importance of the private open land around dwellings in Adelaide. The data that you collect will increase our understanding of how a myriad of individual decisions create a variety of residential environments and our knowledge of how socio-economic status, the structure of the family, the size of the block, and the age of the house and garden affect the use of the garden. The data will also be of interest to planners who are concerned with the density of new residential development.

Because a number of interviewers will be administering the questionnaire it is essential that you read and follow the instructions given in this paper and on the schedule itself; interviewing techniques must be consistent from interview to interview and between interviewers. If you have a problem in the administration of the questionnaire it is essential that you check with the project director before you make any changes from the prescribed wording and techniques.

The questionnaire consists of two parts: the schedule which is completed by the interviewer, and the answer booklet from which the respondent selects answers to fourteen of the questions.

Instructions for interviewers on the schedule are shown in italics.

Identification Number and Address

The identification number (four digits) and address for each dwelling at which the questionnaire is to be administered are given on the assignment sheet. A small amount of data has already been collected for each of the assigned dwellings and the assigned dwellings have been randomly selected on the basis of a sampling frame constructed using these data. It is essential, therefore, that the identification number and address on the questionnaire correspond with those given on the assignment sheet and that no substitutions are made.

Call Backs

If you do not make contact on the first call at an assigned dwelling you are expected to return to the dwelling up to three times. You should make call backs at different times of the day and on different days of the week to avoid missing occupants who are away from home at regular times.

Initial Contact

It is the initial contact that determines whether the respondent will participate in the interview. It is important, therefore, that you be prepared to tell the person answering the door what you are

doing quickly and efficiently before you loose the initiative.

On the initial contact you must:

1. Identify yourself and the organization you are working for (The Australian National University, Canberra). You will carry with you a letter which identifies you and is signed by the Professor of Geography at the A.N.U. and counter-signed by the project director.

2. Explain the purpose of the survey. Usually a brief explanation that you are working on a study of people's recreation activities and the use that people make of their gardens is sufficient.

3. Explain that the respondent's residence was selected at random (or by chance) and that all of the data collected will be regarded as strictly confidential and presented in no form that can be identified with any individual or even any street.

4. Explain that the interview will take between twenty minutes and one-half hour.

5. Ask if the respondent or some member or members of the household are willing to participate. Respondents must understand that participation is voluntary. By all means encourage participation by several members of the household; they will usually arrive at a concensus and the data collected will be the more accurate.

Three reactions that you might get at the time of initial contact are:

1. "Are you selling something?" Certainly not; the A.N.U. would not permit the use of its name.

2. "Tell me more about what you want." Explain that it is an academic study of residential land use concerned with the residential environment and the nature and use of gardens. Be careful not to say anything that could bias answers that you get to questions later.

3. "You don't want to talk to me, I don't know anything." or "You don't want to talk to us, we rent this house." Explain that you are not asking about or interested in what other people do but in what this particular household does with its recreation time and with its garden. Explain again that the individual's answers will become part of a statistical picture of how all sorts of people behave.

If a respondent appears willing to be interviewed but the time is not convenient, or if a wife recommends an interview with her husband, by all means make an appointment for a mutually convenient time. It is recommended that for the period of the study interviewers carry an appointment book. If you make an appointment you must keep it. If you cannot keep an appointment contact the project director or another interviewer and arrange for a substitute.

Confidentiality

Having promised the respondents that the data will be kept confidential you must respect this promise. You should not talk with

anybody about the individual circumstances of any respondent, nor should you show completed schedules to anybody other than the project director.

The Schedule

There are three basic types of questions for which you will be recording the answers:

1. Open ended questions for which you will write the answer; please make sure that your writing is legible.

2. Questions which ask you to record the presence or absence of an item or to record a choice; record the appropriate answer with a tick or check, thus: ✓

3. Questions which require only a "yes" or "no" answer, circle the appropriate answer thus: (Yes) No

Please do not write in the coding column at the right of the page.

At a number of points in the schedule a yes-no question is used to determine whether the following questions are necessary. These questions are followed by a conditional instruction to proceed to a later question, missing questions that are inappropriate. Be sure to follow these instructions carefully.

At the beginning of each section of the schedule is a brief introduction to the section. These introductions must be read to the respondent because they provide continuity to the interview and because, in some cases, they contain a definition that is necessary to the following questions.

In some cases it is necessary to change the tense of the verb, the personal pronoun, the subject, or the object in the delivery of a question. For example, it would be unnecessary and possibly misleading to ask an elderly lady living alone what she "and her family" would prefer. This type of change is acceptable, of course, as long as it in no way alters the meaning or possible interpretation of the question.

Be certain that you ask and record the answer to every question; there should be no blanks on a completed schedule except in questions that you are directed by the instructions to miss. If a respondent can not or will not answer a question mark the schedule accordingly; be sure to differentiate between "could not answer" and "would not answer." If, under special circumstances, a question is not applicable mark the question "N.A." or "not applicable."

In some cases prompting of the respondent is appropriate, but any possibility of interviewer bias must be avoided. Prompting should never take the form of suggesting an answer.

In some cases, if a respondent does not understand a particular question, it may be necessary for you to interpret the question for him. It is important, therefore, that you read and understand each of the questions in the schedule before you begin interviewing. The following

notes elaborate on some of the questions in the schedule. The numbers in the margin refer to the question numbers on the schedule.

B. Description of Garden and Family - The definition of "garden" in the introduction to this section is important because the word appears throughout the questionnaire. If you feel that the definition is not clear to the respondent it should be restated as "all of the private land around your house, including front, back, and side areas."

Similarly the instructions on the use of the answer booklet are important. The booklet should be handed to the respondent while you are telling him what it is for and how you would like him to use it. Do not be upset if the respondent disregards the instruction not to turn pages; having a quick look at the answers in the booklet (most of which are meaningless without the questions) seems to reassure many respondents. Once you begin question 8 the use of the booklet will go smoothly, although there is a tendency for respondents to anticipate the instructions to turn to a new page.

8. It may be necessary to prompt the respondent to move down the list; at first some respondents wait for you to ask them about each item. On items 11 and 12 be sure to record the number of outhouses and cars, boats and caravans respectively.

17. The categories in this question refer to the structure of the household, not to the role played by various members of the household. If you mention "head of household - male" some women tend to become upset. If it is necessary to ask this question it is best to allow the respondent to answer in his own terms and then check the appropriate category on the schedule.

18. Activity "K" (Other) will include any commercial activity for which the garden is used.

19-22. Be certain to read the definition that preceeds question 19 to the respondent and be certain that your delivery of these four questions is clear. Some respondents might hesitate in answering these questions because they consider calcuation of an average for the year difficult. Point out that the answers from which they are asked to choose cover very large categories: "almost none", "less than half", and so on. If the respondent asks if he is to include gardening in his calculations tell him that he should include only that part of his gardening activities that he considers to be recreation activity.

"Adult" in these questions includes all members of the family old enough to drive an automobile.

23-26. "Playing games or sport or working on a hobby other than gardening" is regarded as a single category of active use. If the respondent tries to differentiate between the three types of use ask him to include all three in his calculations.

25, 28 and 32. In these questions that ask for "time of year" record the answers in terms given by the respondent. You may get seasons ("summer"), months ("December and January"), or specific occasions ("Christmas").

26. Be certain that the respondent turns to page 7 in the answer booklet.

In families with no children the respondent may not realize that he is to miss pages 5 and 6.

26, 29 and 33. In these questions it is acceptable to substitute the time of year given in answer to the previous questions (25, 28 and 32, respectively) for the phrase "During that time of year...." Thus you might ask "During the summer approximately how many hours...."

In these three questions the respondent is asked to estimate how many hours the garden is in use, thus three children using the garden for one hour would constitute one hour of use.

27-29. "Entertaining friends, eating or barbequing" is regarded as a single category of social use. If the respondent tries to differentiate between the three activities ask him to include all three in his calculations.

29 and 33. These two questions refer to page 7 of the answer booklet, the page that was first used for question 26. It may be necessary, therefore, to ask the respondent to turn back to page 7 if he has anticipated the instruction to turn the page after question 26.

30-33. "Reading, sun-baking, sitting out or sleeping" is regarded as a single category of passive use. If the respondent tries to differentiate between the three activities ask him to include all three in his calculations.

34. Circle the appropriate numbers, thus: (1) 2 3

1 (2) (3)

43 and 44. These questions refer to the person or persons named in answer to question 42.

46-48. In these three questions it is acceptable to substitute the time of year given in answer to question 45 for the phrase "During the busiest time of year in the garden...."

53. In this question a prompt might be necessary and is included in the question. The answer is by no means limited to the categories listed in the question however, these possibilities are simply included to give the respondent a starting point in his thinking.

54. By "source" of problem is meant the nature or cause of the problem; the source of a noise problem might be "dogs barking", for example. Part 8 (Other) should be asked: "Can you think of anything else that has troubled you in your garden?"

63 and 66. If the existing type of fence is preferred the question should be rephrased "Would you please tell me why that type of enclosure <u>is</u> preferred."

67. If necessary stress that this question refers to garden space, not the form of the house, the quality of the accommodation, or the location.

71-74. It is not necessary to use the phrase "head of the household" in these questions if you have established who the head of the household is. You may substitute "you"/"your" or "your husband's" as appropriate.

78. Note what the time period is; for example, write "married 2 years, moved twice", or "single, moved 6 times in 10 years". You should, by this stage, know what the circumstances of the respondent or the family are and be able to phrase the question accordingly.

G. Post Interview Notes - These notes are an important part of your job because you will almost certainly learn more about the household, the respondent, and the respondent's activities and attitudes during the interview than you will be able to record within the constraints of the schedule. The five questions in Section G should be answered as soon as possible after the interview, but they are meant only as a guide and you are encouraged to record any other information that you think might be useful.

The Follow-Up Interviews

The follow-up interviews, which were conducted by a single interviewer, were more casual and conversational than the first interviews. The following thirteen questions were the basis of the interviews:

1. Have you made any changes to your garden during the last year?
2. Why did you make those changes?
3. Which member of the household does most of the gardening?
4. Which member of the household made the changes?
5. Would you please estimate the cost of the changes.
6. Would you please estimate the amount of time that it took to make the changes.
7. Would you please estimate the amount of time that is spent on your lawns during the busiest gardening season of the year.
8. Would you please estimate the amount of time spent watering by hand during the busiest gardening season of the year.
9. Would you please estimate the amount of time spent on gardening activities other than caring for lawns and watering by hand during the busiest gardening season of the year.
10. Would you say that more time is spent working on the front or the back garden?
11. Do the members of your household ever use your front garden for any sort of recreation activity? If "yes", please elaborate.
12. Do you feel that it is important that all of the front gardens in the street be well maintained? Why?
13. It is sometimes said that suburbs are visually monotonous. Do you agree?

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